NETWORK WORLD
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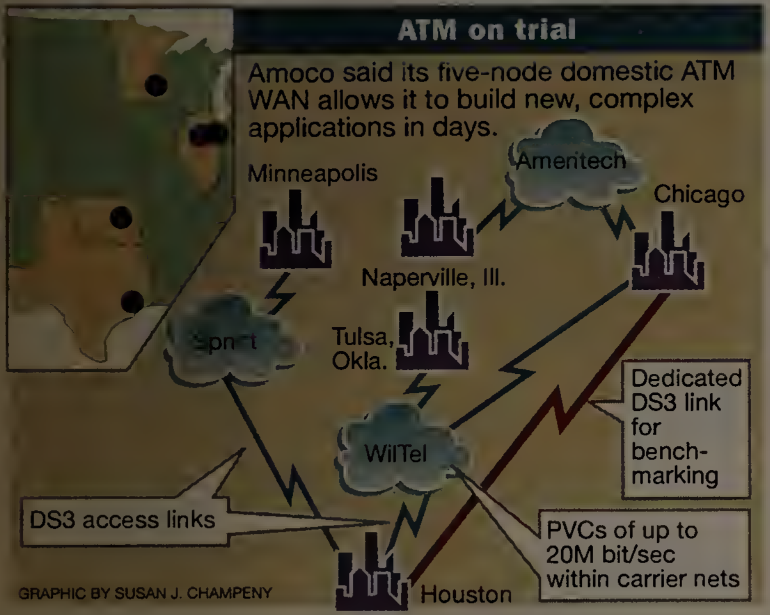
ATM on trial
Amoco said its five-node domestic ATM WAN allows it to build new, complex applications in days.
Minneapolis
Amentech
Chicago
Naperville, Ill.
Sprint
Tulsa, Okla.
WilTel
Dedicated DS3 link for bench-marking
DS3 access links
PVCs of up to 20M bit/sec within carrier nets
Houston

GRAPHIC BY SUSAN J. CHAMPENY

Amoco finds ATM still needs refining

BY JOANIE WEXLER

Chicago

Six months into its sweeping Asynchronous Transfer Mode trial, Amoco Corp. has realized significant performance boosts for some existing applications, but the firm is still awaiting application enablers that will let it fully exploit the technology.

In some of its high-performance computing areas, the oil company has seen "encouraging early numbers" using 155M bit/sec ATM links in lieu of shared Fiber Distributed Data Interface and switched Ethernet connections, said David Beering, staff telecommunications analyst.

Before ATM will revolutionize the company's work processes,

See ATM, *page 54*

The object Shell game

Building net apps can be a challenge.

BY ADAM GAFFIN

San Francisco

Application developers at Shell Oil Co. have become recycling experts, but it's hardly been a gas.

Spurred by staff reductions and the need to bring new client/server applications on-line faster, the company is building a library of reusable programming objects to speed development and ensure interoperability of applications used to support its search for new oil sources.

Such object reuse has long been a mantra of object vendors, which cite purported savings in cost and application development time as key reasons for moving to object-oriented applications. When pressed, vendors will acknowledge that these savings will come only after the first project, when users have built up a library of objects they can reuse.

See Shell, *page 54*

NEWSPAPER

HP strives for 'Synergy' in next release of OpenView

BY JIM DUFFY

Orlando, Fla.

Hewlett-Packard Co. next week will reveal a key component of a future HP OpenView release that will allow users to more easily manage multiprotocol enterprise networks.

At the OpenView Forum user group meeting here, HP will unveil the OpenView Common Platform, which provides a common set of node discovery, mapping, topology and event-handling services for multiple network environments.

Code-named Synergy, the technology will likely be part of the next major edition of OpenView, which is expected next year, said Larry Robinson, HP's OpenView product-line marketing manager.

"It will become the common interoperability point for all of our platform-based [applications]," he said.

For example, the new technology is intended to provide greater consistency and tighter data integration between OpenView management applications for IBM Systems Network Architecture, Novell, Inc. NetWare and Digital Equipment Corp. DECnet environments.

Under Common Platform, OpenView applications for managing different net environments will share a consistent data repository for storing and retrieving management data, as well as common interfaces for accessing OpenView platform services, Robinson said.

This will allow users to view nodes from those networks on a single OpenView map and gauge, for example, how a node failure in one environment will affect nodes in another. An event in one network might then kick off an OpenView

See Synergy, *page 54*

HP's Common Platform

- Provides a common method for discovering, mapping, monitoring and collecting data across multiprotocol nets.
- Allows users to gauge the effect of events in one network on another.
- Fosters tighter integration between OpenView applications.
- Enables customization of the management environment.
- Makes network-specific management applications more generic.

JOHN HARQUAIL

Allison Mankin and Scott Bradner last week unveiled IPng, a new IP version that supports billions of addresses plus new flow control, security and other features.

Next-generation IP takes center stage

BY ELLEN MESSMER

Toronto

After a year of fierce debate over competing plans, the Internet's standards-setting body last week put a technical stake in the ground for the Internet Protocol of the future.

The IETF's IP next generation (IPng) will solve the problem of dwindling address space by supporting 16-byte addresses that will allow billions more users to surf the Internet.

See IP, *page 55*

ISO to accredit IETF as int'l standards body. Page 6.

AT&T previews Notes service costs

BY KEVIN FOGARTY

Bridgewater, N.J.

AT&T promised customers that it would roll out a Lotus Development Corp. Notes-based public network service early next year but never said it would be cheap.

Preliminary price ranges revealed by the carrier last week for its AT&T Network Notes service seemed high to analysts and users, but manageable nonetheless. One caveat, however, is that usage-based rates for the service could be a killer for heavy Notes users.

AT&T Network Notes is one of several Public Data Services (PDS) offerings that AT&T announced in March. Other options will give customers access to Novell, Inc. NetWare services and the Internet.

AT&T Network Notes will enable users to dial in to Notes servers maintained by the carrier across a NetWare-based network and T-1 frame relay backbone. Customers will be able to access the service using a regular Notes client or a special low-cost version of the groupware package that is being developed by Lotus.

To use the Notes service, companies will have to pay between $500 and $1,000 per user per year. That price is an estimate that includes server and network maintenance, a monthly charge of as much as $12 per user for PDS access, hourly

See AT&T, *page 55*

AT&T Notes billing breakdown

AT&T Public Data Services basic charges:
- $10 to $12 a month maintenance charge per user (volume discounts up to 75%)
- $4 to $8 an hour dial-up connect charges Or: $500 to $5,000 a month dedicated connect charges (depends on access speed and throughput)

AT&T Network Notes premium:
- Undetermined per-byte Notes surcharge

Per user total: $42 to $83 a month (AT&T estimate)

Briefs

Merger mania. The consolidation in the networking industry continued its torrid pace last week when Chipcom Corp. acquired David Systems, Inc. and Novell, Inc. made an equity investment in Integrated Systems, Inc. The $8 million Chipcom/David Systems deal, expected to be finalized this fall, will give hub vendor Chipcom an established Ethernet stackable hub line and access to 100M bit/sec Ethernet technology. In the Novell deal, Integrated Systems will assume control of Novell's FlexOS real-time embedded operating system, allowing Novell to focus more of its efforts in the networking market.

Oh no, EO. AT&T last week said it has shut down EO, Inc., the maker of the first personal communicator, due to poor sales. AT&T, which owned 52% of the Santa Clara, Calif., firm, said it will honor warranties on the EO 440 and 880 hand-held devices purchased by customers, and will supply parts and service for the devices. AT&T is evaluating other plans for wireless devices, the company said.

Still registering a pulse. Motorola, Inc.'s elusive Mobile Networks Integration (MNI) interoperability scheme is "alive and well," and products will ship by year end, said Robert Growney, executive vice president of Motorola, at an ARDIS Co. conference last week.

Motorola announced MNI, a set of hardware and software products intended to blend wired and wireless mobile applications, in April 1993. Products were due in the first quarter, but none have yet appeared. Mary Jane Grinstead, ARDIS vice president of marketing and sales, hinted that another company would assume development of MNI, but she would say only that it would not be Motorola's former ARDIS partner, IBM.

Taligent show. IBM and Apple Computer, Inc.'s Taligent, Inc. venture last week publicly demonstrated for the first time applications based on its object-oriented software. Before several hundred curious Object World attendees, company engineers showed electronic mail, graphics and other applications running on AIX, OS/2 and Windows NT systems.

MCI gets railroaded. An Amtrak construction crew doing repair work in a New Jersey rail yard last Thursday accidently severed an MCI Communications Corp. fiber bundle, cutting off service in the New York-Washington, D.C. corridor. The noon cut of 388 T-3 lines disrupted mostly voice traffic for customers in the New Jersey, New York, Philadelphia and Washington areas. MCI took steps to reroute traffic during the outage and had service restored by 5:40 p.m.

Attachmate gets attached. Attachmate Corp. last week said it has completed the acquisition of Datasix, a small database connectivity firm based in St. Gely du Fesc, France, for $1.2 million.

The acquisition will add to Attachmate's collection of host connectivity tools. Datasix's primary product, Select Executive, enables users to access back-end databases from applications running on Windows, DOS or OS/2 applications.

Datasix is a 10-person firm that was founded in 1987 and whose products are used at approximately 3,000 companies.

OMG on track. The Object Management Group (OMG) is still looking at a year-end release for its specifications for object request broker (ORB) interoperability, despite unresolved issues among vendors over how to get the ORBs to talk to each other. At issue is whether to use Transmission Control Protocol/Internet Protocol or Open Software Foundation, Inc.'s Distributed Computing Environment remote procedure calls. OMG President Chris Stone is optimistic that a compromise can be reached.

Contacts

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NRC releases high-end Ethernet switching hub. *Page 19.*

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Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467 or (508) 820-1103, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.*

We need to share modems over either a TCP/IP or Microsoft Corp. Windows for Workgroups network. We have an RS/6000 as our database, print and file server. We currently have a Digiboard Corp. PC/8e multiport communications board in a Gateway 2000 4DX-33 PC. With the Digiboard, we can have as many as eight modems in operation at any given time. Since Windows for Workgroups allows users access to a shared fax or modem, we thought that finding software to share the modem would be relatively easy; however, we have been looking for the software for several months. I would prefer to share the modems with TCP/IP and not have to purchase more hardware; but at this point, any solution you could provide would be very helpful.

Randy Cona, Rochester, N.Y.

William Welch, a technical support representative at Corporate Software, Inc., a PC software products, support and systems integration company based in Norwood, Mass., replies:

I am currently unaware of any modem-sharing program that runs over TCP/IP. To use the Digiboard, you would first need to have a LAN-based server plus communications server software, such as Novell, Inc.'s NetWare or Microsoft's Windows NT Advanced Server.

There is a solution, however, for modem sharing over a Windows for Workgroups network; however, you cannot use the Digiboard in this situation. LANSource Technologies, Inc.'s WINport for Workgroups allows modem sharing among Windows for Workgroups machines. WINport for Workgroups allows stand-alone Windows-based PC communications or fax applications to share modems over a network.

You might also want to check out WINport, a similar product with additional features, including drivers for modem pooling and support for remote control software. Prices for WINport for Workgroups start at $149 for a one-modem license and increases by $149 for each additional modem. Pric-

See **Help desk**, *page 42*

Stack to the future.

Introducing the HP AdvanceStack family of 10Base-T stackable hubs.

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LDDS ups WilTel bid to $2.5b

Firm could rise to top tier of long-distance carriers.

BY BILL BURCH

Washington, D.C.

LDDS Communications, Inc., the nation's fourth largest long-distance company, last week bumped up its bid for WilTel and its national fiber network to $2.5 billion, an offer some analysts said might be too good to refuse.

LDDS' marketing savvy and growth potential combined with WilTel's assets could lift LDDS into the top tier of long-distance carriers with AT&T, MCI Communications Corp. and Sprint Corp., analysts said. WilTel is the only carrier other than the Big Three that owns a national fiber network, it has a number of large corporate clients and is considered a leader in high-speed data network technologies.

Overall, the acquisition could mean lower prices for the companies' customers as LDDS would be able to cut costs by running its traffic over the WilTel fiber network and would broaden the customer base over which to spread its fixed costs. Any price cuts from LDDS could put pressure on the Big Three long-distance carriers to do the same, with LDDS gaining on them in terms

See Wiltel, *page 55*

Carriers at a glance

LDDS Communications, Inc.

1994 revenue: $1.8 billion

Based: Jackson, Miss.

Primary business: Long-distance service

Worth noting: Has grown rapidly via acquisitions, including those of Metromedia Communications Corp. and Resurgens Communications Group.

WilTel

1994 revenue: $1.2 billion

Based: Tulsa, Okla.

Primary business: Long-distance service

Worth noting: A pioneer in Asynchronous Transfer Mode and frame relay services; owned by petroleum pipeline giant The Williams Companies, Inc.

GRAPHIC BY TERRI MITCHELL

Narrowband PCS spectrum auction brings in big bucks

BY BILL BURCH

Washington, D.C.

Bids for narrowband personal communications services (PCS) spectrum auctioned off here last week quickly climbed into the stratosphere, with top bids of $80 million, far exceeding estimates of what the nationwide radio frequency licenses would bring.

While the hefty prices paid could mean higher service fees, the auctions should also hasten the launch of new services such as wireless voice messaging with consistent national coverage, analysts and users said.

"The more money [carriers] invest up front, the quicker they'll be motivated to deliver services," said Gerald Hoffman, president of The Gerald Hoffman Co., a Chicago consultancy. However, the hefty investments mean higher prices initially, he said. "The guy who invests a lot of money has to show a return on investment — it's pure mathematics."

To users, new national paging services sound appealing. "As a company with national requirements, naturally for business purposes we'd like to see the most consistent coverage," said Lee Nolan, senior telecommunications engineer at The Travelers Co. in Hartford, Conn. "Anything with consistent, smooth coverage from one coast to another makes our lives a lot easier."

Altogether, the auction brought in $617 million for the 10 narrowband PCS licenses.

Each of the five two-way 50-kHz licenses went for $80 million. Winning bidders were Paging Network, Inc. (PageNet) and KDM Messaging Co. with two licenses each, and Nationwide Wireless Network Corp. with one. The licenses will allow the companies to provide full two-way voice and data messaging.

Nationwide Wireless Network Corp. also picked up one of three 50-kHz/12.5-kHz licenses, which each went for roughly $47 million. The other two winners were BellSouth Wireless and AirTouch Paging, a Pacific Bell spin-off.

The 12.5-kHz backchannels specified with those licenses will allow pagers to acknowledge messages or let users send limited responses to messages.

The remaining two licenses with one-way 50-kHz spectrum went to PageNet and Pagemart II, Inc. for $37 million and $38 million, respectively.

If carriers have to charge more for paging to pay for expensive licenses, they will still need to keep prices low enough to attract users. "They can spend as much money as they want as long as they come out cost-effective for me," said Tom Dawson, vice president and general manager of equipment services at Bank of America in Livermore, Calif.

Last week's narrowband auctions will be followed in the fall by broadband auctions for voice services. Although the narrowband prices ran much higher than expected, they may not be a good indicator of what companies will be willing to pay for broadband, according to Peter Bernstein, vice president of research at Probe Research in Cedar Knolls, N.J.

"Two-way messaging that can be done inexpensively, is...an enormous market opportunity," Bernstein said. But being "the fourth, fifth, sixth, seventh cellular company — given the strength of the existing providers — may not be as good a business proposition as trying to grab one of these national narrowband licenses."

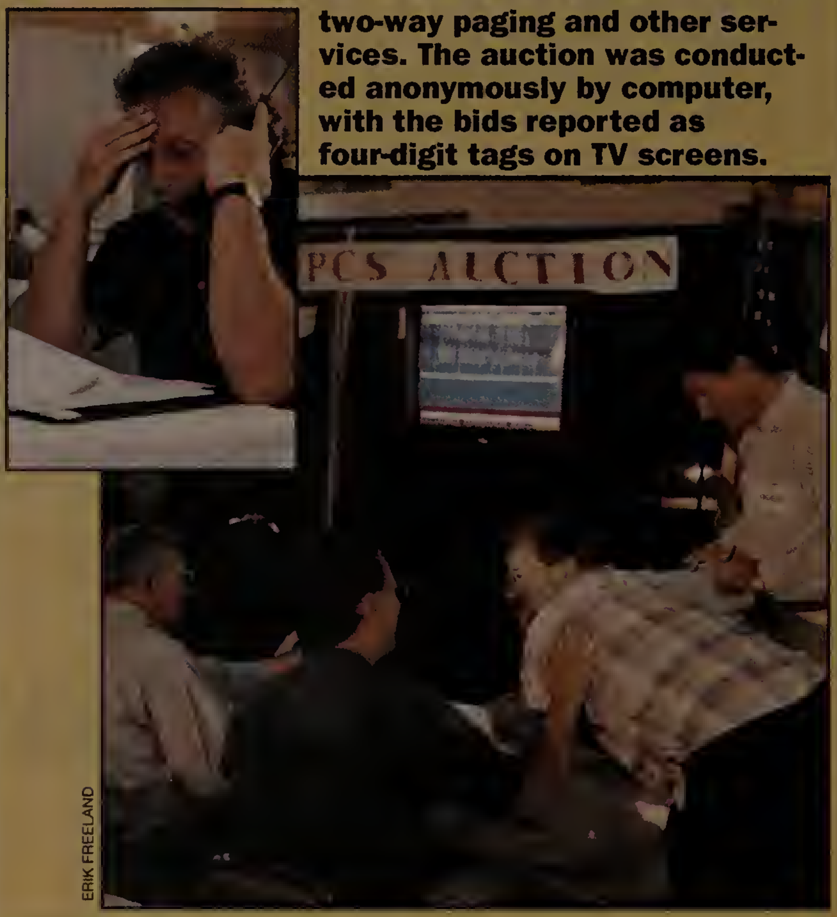
The high prices in this round of auctions are a good measure of carriers' hunger for narrowband spectrum. Companies such as McCaw Cellular Communications, Inc., Mobile Telecommunications Technologies Corp. (Mtel) and PageNet have narrowband applications in development that will increase industry demand for spectrum.

PageNet in Plano, Texas, the country's largest paging company, has been working to develop paging with voice messaging, which would allow users to receive up to two minutes of voice messages over a pager.

The service, to be test-marketed in late 1995, is planned as a one-way service but needs a back channel to notify the paging system of a user's location. By first locating a user, the service can confine the voice message to a particular area, saving spectrum in other areas.

Another auction bidder, Mtel, operator of the Skytel paging network, managed to acquire a nationwide license via a pioneer's preference the Federal Communications Commission granted on July 13. Mtel plans to roll out two-way messaging in the nation's top 300 markets in the second half of next year.

➻Senior Editor Joanie Wexler contributed to this article.



Last week, 29 companies bid on nationwide narrowband PCS licenses that would enable them to offer two-way paging and other services. The auction was conducted anonymously by computer, with the bids reported as four-digit tags on TV screens.

ERIK FREELAND

SynOptics delays delivery of fast Ethernet switch

BY SKIP MACASKILL

Santa Clara, Calif.

Due to problems with custom processors in its 100M bit/sec Ethernet switching hubs, SynOptics Communications, Inc. will delay shipments of the devices to early adopters for at least two months and push back general availability for up to six months.

The 28000 series has also come under fire from some of SynOptics' resellers and distributors for problems unrelated to the flawed application-specific integrated circuit (ASIC) technology, including a lack of adequate address space as well as a limited buffering queue.

The first LattisSwitch System 28000 models, originally expected to be generally available by year end, now may not hit the market until mid-1995.

Announced at the NetWorld+Interop show in May, the 28000 is based on the company's Fast Frame packet switching technology, which offers 10M and 100M bit/sec switched Ethernet connections in the same device.

A FEW GLITCHES

The company had planned to get beta versions of the product into early users' hands under a Test Drive program by last month but was forced to pull the switches back when the ASIC problems arose.

According to Gary Law, director of business development for SynOptics, the first version of the ASIC chip had a couple of software bugs that caused some timing glitches and network time-out problems.

Those glitches meant the chip had to be respun — an engineering process that takes at least two months. This pushes back the original Test Drive delivery dates of July, September and December for three 28000 models by the same amount of time.

The ASIC problems are not considered uncommon in this type of engineering project, Law said.

But the ASIC issue is only one part of the problem.

"We're getting feedback that support for 1,024 addresses in a device of this nature is simply not enough," said one reseller who requested anonymity.

"The buffers at each port will also need to be expanded for users to look at this product seriously," the reseller added.

Law said SynOptics is working to address these issues.

According to Jennifer Pigg, program director at The Yankee Group, a consultancy in Boston, SynOptics is currently between a rock and a hard place. Its profit margins are falling in the low-end stackable hub market, while it cannot generate volume on its high-end LattisSystem 5000 hub or LattisCell Asynchronous Transfer Mode switch, she said.

"SynOptics needed a mid-life kicker to relieve some of its financial pressures, and the 28000 was the product that was going to help them do that," according to Pigg.

"Delay of the 28000 is not good news and will be disappointing to the company's installed base, but the product is just the tip of the iceberg in how SynOptics will address the overall LAN switching market — a space it is likely to generate a lot of revenue in over the next few years," she added.

CLARIFICATION

In the article "Documents from the desktop" in the July 25 issue's LAN World section (page L8), Watermark Software, Inc. was referred to as offering a low-end product, the Discovery Edition. Watermark also offers a high-end package called the Professional Edtion.

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ISO to accredit the IETF as int'l standards body

BY ELLEN MESSMER

In the interest of furthering convergence between OSI and TCP/IP, the International Standards Organization is ready to acknowledge the Internet Engineering Task Force (IETF) as a legitimate standards organization.

The international Geneva-based standards organization is expected in September to grant the IETF the official recognition it has long sought, putting the IETF's status much on a par with ANSI. The ISO's decision to bless the IETF's Transmission Control Protocol/Internet Protocol suite could bring an end to further work on comparable ISO Open Systems Interconnection data communications standards.

"We want to move forward to a converged set of standards," said Jack Houldsworth, a leading engineer at International Computers, Ltd. in the U.K. Houldsworth helped set up the liaison between the ISO's Joint Technical Committee (JTC1) and the Internet Architecture Board (IAB), which oversees IETF standards work (see graphic).

Just as Vinton Cerf is regarded as the "father of the Internet," Houldsworth has earned the moniker "father of OSI" due to his work developing the seven-layer OSI stack.

Over the years, advocates of OSI who labored under the slow ISO standards process sometimes denigrated the IETF as an unruly renegade group outside the accredited standards world. But the TCP/IP's success is forcing the ISO to respect the IETF.

"It's like the family inviting the bastard child to dinner," said Paul Mockapetris, IETF chair.

OSI-based nets have taken hold in Europe, and the European Commission requires any publicly funded net purchased for at least $150,000 to adhere to the OSI protocols, Houldsworth said. But the widespread use of the TCP/IP protocols and the growth of the Internet have given TCP/IP the market lead.

"Despite the rules, there's a lot of TCP/IP in the government in Europe, too," Houldsworth said. The existence of OSI and TCP/IP as competing open systems protocols creates confusion for both the information technology industry and users, he added.

"The salesmen don't know what to sell, and the users don't know what to buy," Houldsworth explained. "If we could all agree on a common standard, we could all go on with the business of building nets."

The ISO and the IETF should move forward with a common work plan, said Houldsworth, who is involved in standards work in the ISO's SC6 data communications group. After it joins the ISO, the IETF take the reins from the SC6 to work toward that goal. "This is under discussion," he said.

Under the agreement drafted between the IAB and JTC1, ISO would essentially rubber-stamp completed IETF standards without requiring ISO committee review.

The ISO also has this special rubber-stamp relationship with the influential IEEE LAN committee, part of ANSI. The ISO is likely to set up a similar relationship with the ATM Forum, Houldsworth added.

"We're grinding down the last few words of the memo of understanding between ISO and the IETF that would let them quote our standards for their use and vice versa," Mockapetris said.

"As a user, I'm really concerned about application interoperability," said Walt Houser, policy analyst at the Department of Veterans Affairs. "I don't care how it's done, I just want it done."

Analysts praised the ISO's decision as a logical step. "International standards organizations should bow to the inevitable," said Tom Nolle, president of CIMI Corp. in Voorhees, N.J. He said global stature should bring with it a greater sense of accountability among the IETF's policy wonks.

"The IETF has not been tremendously responsive to requests from outsiders," he said. "I hope an action like this will convince the IETF that some of their views and practices have been considered exclusionary, or parochial at best, in the context of a global standards organization."

Senior Writer Michael Csenger contributed to this article.

What's in a name?

An acronym derived from its French name, ISO is officially translated as the International Organization for Standardization. To fit the acronym and avoid confusion, many publications, including *NW*, refer to it as the International Standards Organization.

The ISO organizational chart

ISO
Coordinates work of national bodies such as ANSI and the British Standards Institute.

Joint Technical Committee (JTC1)
Voting members are national standards bodies. Liaison now set up with the Internet Architecture Board, which supervises the IETF.

Key JTC1 groups

- SC6 for Data Communications
- SC21 for Architecture
- SC18 for Office Systems
- SC27 for Security

SOURCE: THE OPEN SYSTEMS HANDBOOK

IBM to merge its IIN with Advantis to form global unit

BY MICHAEL COONEY

Armonk, N.Y.

IBM last week continued to push its way to the front of the worldwide networking crowd with the formation of a new business unit devoted to growing the largest high-speed voice and data network.

The IBM Global Network unit will integrate the functions of Advantis in the U.S. with IBM Information Network (IIN) outposts in Europe, Asia and the Pacific Rim.

IIN and Advantis, a partnership formed by IBM and Sears, Roebuck and Co., are wholly owned IBM subsidiaries. But until now, they have been only a loosely knit pair with no central driving force.

TIMOTHY SCHNEIDER

HEATON

"The idea is that we will provide one-stop corporate shopping for voice, data and electronic mail services across a worldwide network," said Syd Heaton, chairman and chief executive officer of Advantis in Schaumburg, Ill.

John Whiteside, general manager of the IBM Global Network, called the unit "the business person's Internet."

Whiteside most recently was senior vice president in charge of global alliance management at MCI Communications Corp.

MCI, as well as AT&T, British Telecommunications plc and EDS Corp. are seen as the new unit's chief rivals.

But Heaton said IBM will be ready. On Day One, IBM Global Network will have more than 25 million users, a networking infrastructure in over 700 cities worldwide and about 5,000 employees providing networking-based services to 23,000 companies in 94 countries, he added.

IBM Global Network will work closely with another new IBM unit, IBM Networked Application Services, which Big Blue formed in June (*NW*, June 20, page 4). That group brings together previously disparate application-related technologies, such as multimedia, Internet services and videoconferencing.

Applications coming from the IBM Networking Application Services group will run on platforms linked to the networks being provided by IBM Global Network, Heaton said.

Included will be worldwide access to video-on-demand services and access to the Asynchronous Transfer Mode-based net that Advantis will be deploying in the U.S. during the next few years.

Analysts said IBM's long-term strategy with these new units is to establish the firm as a world-class networking services and applications provider.

"IBM continues to shift its core businesses from being totally dependent on hardware sales to a more network-centric view," explained Sam Albert, president of Albert Associates, Inc., a consultancy based in Scarsdale, N.Y. "Taken together, the two units are addressing high-profile technologies IBM wants to be a leader in." ◪

Congress sits idle as RBHCs, IXCs squabble

BY DAVID ROHDE

Washington, D.C.

Despite repeated demands for telecom reform, local and long-distance carriers are now admitting they would rather push away from the negotiating table than be forced to swallow something they do not like.

The regional Bell holding companies two weeks ago walked out on negotiations to amend a bill sponsored by Sen. Ernest Hollings (D-S.C.) that would allow RBHCs to enter the long-distance business once competition arrived in the local loop.

As a result, by late last week, movement toward Senate committee action had stalled. "I don't think there's much going on," said Ward White, vice president of government affairs for the U.S. Telephone Association, representing the RBHCs and other local exchange carriers.

The phone companies "definitely" would rather reform legislation fail than have the current Senate version go through and meet up with a less stringent bill passed by the House, White said. Failure to pass a bill would mean the lines between long-distance and local markets would remain firm. It would also threaten to saddle the Federal Communications Commission with more vetoes by the federal courts of its pro-competitive moves as the courts narrowly interpret the existing Communications Act of 1934.

Back-room negotiations have become key to the fate of reform legislation because of the paucity of public outcry compared to other major issues on Capitol Hill, like health care, crime and welfare reform. "There was more impetus on legislation for cable because people were mad about cable," White said.

The RBHCs have shifted their support to a bill introduced by Sen. Bob Packwood (R-Ore.) and Sen. John Breaux (D-La.) that would throw most telecommunications markets open without significant major conditions in one year. The long-distance carriers generally support the Hollings bill.

One glimmer of activity arose last week when staffers for six farm state senators started drawing up amendments relating to the funding of universal service. "The most contentious issues have been put aside for the moment while the rural issues get considered," said an AT&T spokesman here.

But Senate staffers will have to get back to the long-distance issues before any bill can move forward, he added.

The long-distance carriers have taken advantage of the lull to push a line that local competition should include issues relating to dialing parity and number portability.

These are not onerous conditions, the AT&T spokesman said. "These things happen every day in long distance," he added. ◪

Lines in the sand

Bottom-line LEC and IXC demands regarding each other's markets:

Local exchange carriers want:	Long-distance carriers want:
1. **A "realistic test" —** LECs should not be required to show "actual and demonstrable competition" in their local markets before being allowed into long distance.	1. **Dialing parity —** It should take the same number of digits to dial using a new provider as with the incumbent LEC.
2. **A quick procedure —** Approval to go into long distance should be expedited.	2. **Local number portability —** Customers should be able to take their telephone numbers with them if they change local carriers.
3. **Incidental relief —** Immediate authority to offer wireless long distance and cable programming.	3. **Balloting —** Customers should be given an opportunity to choose their local carrier.

GRAPHIC BY TERRI MITCHELL

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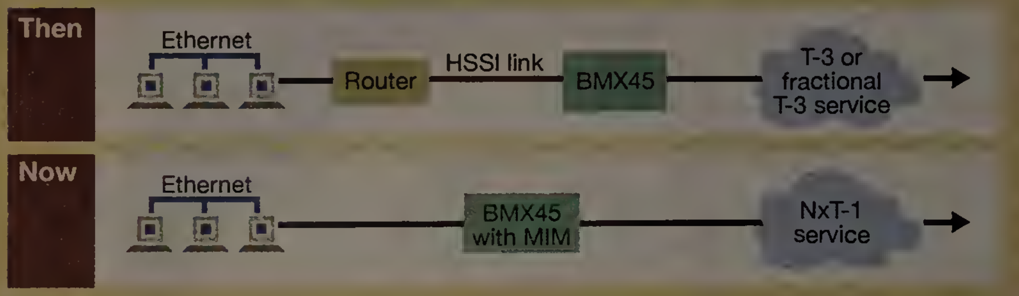
A T3plus plus

A new Ethernet interface for the T3plus BMX45 mux will let users send LAN traffic over a WAN at native speeds without using expensive T-3 links.



GRAPHIC BY SUSAN SLATER

T3plus mux to get LAN module

BY MICHAEL CSENGER

Santa Clara, Calif.

T3plus Networking, Inc. today will introduce an Ethernet local net interface module for its BMX45 line of broadband multiplexers.

In conjunction with the BMX45's Multimegabit Inverse Multiplexing (MIM) capability announced earlier this year, the new module will let users send Ethernet traffic over the wide area at native 10M bit/sec LAN speeds without requiring costly T-3 or fractional T-3 service. The MIM technology lets the BMX45 inverse-multiplex seven separate T-1s as one 10.5M bit/sec pipe, while the Ethernet module provides a native LAN interface to the BMX45.

The firm's original strategy required users to feed Ethernet traffic into a router, which was connected to the BMX45 over a High Speed Serial Interface link and then out over a wide-area T-3 line (see graphic).

The company is repositioning itself to serve users that cannot afford and do not require the 45M bit/sec broadband T-3 capabilities that the BMX45 originally offered, said Larry Morgan, senior vice president of sales and marketing for T3plus, based here.

"There's a huge wave of business waiting at the T-1 rate and below," Morgan said. "Those wanting to move up can't make an economical step all the way to T-3. Our strategy offers a gentle segue, and we're enhancing that capability now with this [Ethernet] LAN interface."

Morgan said T3plus also will offer a 4M and 16M bit/sec token-ring interface early 1995.

The company's Asynchronous Transfer Mode (ATM) plans also involve T-1 inverse multiplexing. T3plus recently filed a patent for ATM MIM technology, which will let users aggregate multiple T-1 ATM circuits.

Morgan said an ATM access module for the BMX45 will be announced early 1995. A likely configuration would involve a LAN interface and other data or voice interfaces now offered, all fed through an ATM module and inverse-multiplexed over multiple T-1 ATM links.

"We're finding this to be a very hot product, with a lot of interest looking six months ahead," said George Rhodes, president of SFA/Sacom, Inc., a value-added reseller in Frederick, Md.

Rhodes said his clients have installed T3plus equipment in recent months specifically because they need bandwidth between T-1 and T-3 rates, and will deploy ATM at similar rates as carrier services come on-line.

Even without ATM, the Ethernet/MIM modules are a promising combination, said Michael Zboray, research director of networking technology at Gartner Group, Inc., a Stamford, Conn., market research firm.

"This Ethernet module is just a simple bridge, nothing exotic; but combined with their inverse multiplexing, you get a concept similar to LAN emulation or the transparent LAN services offered by carriers like MFS Datanet," Zboray said.

The module is available now for $1,750.

©T3plus: (408) 727-4545.

AT&T GIS unveils Windows NT for its System 3000 workstation line

BY JIM DUFFY

Dayton, Ohio

AT&T Global Information Solutions (GIS) this week will roll out StarSentry Network and Systems Management for Windows NT, a management platform for governing Windows NT-based System 3000 workstations and servers.

Running on System 3000 under Windows NT, the product combines Network Managers, Inc.'s NMC 4000 platform, Microsoft Corp.'s Systems Management Server (SMS) and AT&T GIS' Server Manager software.

NMC 4000 provides integrated management of multivendor local- and wide-area networks. Microsoft's SMS provides software distribution, diagnostics and inventory management for Windows NT systems and servers. AT&T GIS' Server Manager is a Simple Network Management Protocol agent for System 3000 servers that monitors the operational status of the server hardware.

Though based on NMC 4000, StarSentry Network and Systems Management for Windows NT will eventually conform to AT&T's OneVision management framework, which is based on Hewlett-Packard Co.'s HP OpenView platform, said Martin Sinnott, director of Windows NT marketing for AT&T GIS.

"What we're doing with this product announcement is responding to customers who are implementing Windows NT [on System 3000] systems today," Sinnott said.

"The unique part about it is they're taking network management a step down in the processing architecture," said Walt Dymek, associate analyst at Datapro Information Services Group in Delran, N.J. "A lot of your small organizations don't have Unix boxes installed and RISC platforms available. By putting network management on an Intel Corp.-based Windows NT foundation, it opens up a new marketplace."

StarSentry Network and Systems Management for Windows NT will cost about $20,000. It will be available in the fourth quarter.

©AT&T GIS: (513) 445-5000.

UNIX AND SNA

IBM brings AIX to mainstream

BY MICHAEL COONEY

New York

IBM oiled one of the noisiest parts of its enterprise networking machine last week when it added improved support for client/server, LAN and SNA environments to its AIX operating system family.

The company announced separate client and server versions of its AIX operating system, multiprotocol and Systems Network Architecture support for its AIX SNA Server/6000 platform, an electronic mail package from Hewlett-Packard Co. for networked AIX workstations and new AIX-based net performance management tools.

With the announcements, IBM is trying to make its version of Unix more palatable to corporate enterprise network managers.

"IBM doesn't want AIX [systems] to be islands of resources that are impossible to reach; it wants them to be an integral part of the enterprise network," said Frank Dzubeck, president of the Communications Network Architects, Inc. consultancy in Washington, D.C.

IBM said the new release of AIX, Version 4.1, includes the most significant enhancement to the operating system since its introduction — separate client and server packages.

Until now, the full AIX package, requiring over 32M bytes of memory, was needed on each workstation in the net.

The new AIX 4.1 for Clients, on the other hand, requires only 16M bytes. It includes a graphical interface and support for two sessions with the server. AIX 4.1 for Servers includes the gamut of server functions, including network file, print, directory and application support.

"This feature will enable users and software developers to generate [and run] client/server applications more efficiently in a Unix environment," said Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J.

AIX Version 4.1 also includes built-in support for IBM's Systems Object Model (SOM), the company's object-oriented application development environment. IBM's goal with SOM is to let users and developers more easily write applications that can run across multiple platforms.

SOUPED-UP SNA SERVER

For AIX users that need access to the SNA world, IBM announced new functionality for its AIX SNA Server/6000.

Two RISC System/6000 workstations can now communicate over wide-area nets with the AIX SNA Server/6000 over a single Synchronous Data Link Control line, enabling users to make more efficient use of expensive leased lines.

IBM also added support for its AnyNet technology to the AIX SNA Server/6000, making it an AnyNet gateway. AnyNet is IBM middleware that links applications to any underlying data transport.

The gateway will be able to ship data between TCP/IP Sockets applications over an SNA backbone and allow Advanced Program-to-Program Communications/LU 6.2 applications to communicate over a Transmission Control Protocol/Internet Protocol net.

"Adding AnyNet to the AIX SNA Server makes sense because it offers those users easier access to enterprise resources, plus it brings the AIX world even with the rest of the IBM AnyNet world," Nolle said. IBM offers AnyNet support on its OS/2, MVS and Application System/400 platforms.

The firm also added support for Fiber Distributed Data Interface to SNA Server/6000, adding to its existing Token-Ring and Ethernet support.

In the E-mail realm, IBM said it would begin reselling HP's OpenMail package, which includes support for an OpenMail AIX server and OpenMail client support for Microsoft Corp. Windows, Apple Computer, Inc. Macintosh, Sun Microsystems, Inc. Solaris and HP-UX clients.

With OpenMail, IBM AIX users can build scalable E-mail systems supporting from 50 to 5,000 users.

AIX action

Product	Pricing	[illegible]
AIX 4.1 (server)	$1,500	Aug. 5
AIX 4.1 (client)	$800	Aug. 5
Performance Toolbox	$4,995	Aug.5
Performance Aide	$450	Aug. 5
AIX NETBIOS and IPX/SPX Support/6000	$995	Now
OpenMail for AIX (server)	$145 to $36,250 (depending on number of users)	Not available (NA)
OpenMail for AIX (client)	$12,500 (for more than 50 clients)	NA
AIX SNA Server/6000	NA	Now
AnyNet APPC over TCP/IP feature	$750	Now
AnyNet Sockets over SNA feature	$750	Jan. 27, 1995

Also in a effort to broaden the AIX environment, IBM announced AIX NETBIOS and IPX/SPX Support/6000, a program that lets RS/6000s access resources residing on Network Basic I/O System- and Internetwork Packet Exchange-based LANs.

"If an AIX user wants to gain access to a Novell server or an IBM LAN Server, he can now do it through this program," said Dave Passmore, president of the Decisis, Inc. consultancy in Herndon, Va. "This should be useful for AIX users who need to interact with corporate LANs."

Finally, to assess the performance of networked AIX boxes, IBM rolled out the Performance Toolbox (PTX) and Performance Aide for AIX (PAIDE) programs.

PTX consists of manager code for the server and agent code for the client. The manager records systems statistics from the client, such as disk space.

From the manager, users can load-balance among a network of AIX boxes. The data gathered by the manager can be stored on the server or passed along to a NetView/6000 or other Simple Network Management Protocol-based manager.

PAIDE provides a set of tuning and performance analysis tools. With it, users can adjust buffers and other performance parameters on local and remote workstations. ☒

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intel inside

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Bell Atlantic unveils flexible ATM pricing

RBHC files nation's first ATM tariff with FCC.

BY DAVID ROHDE

Washington, D.C.

Claiming pent-up ATM demand from about a dozen federal agencies, Bell Atlantic Corp. last week filed the nation's first Asynchronous Transfer Mode tariff with the Federal Communications Commission.

Under the filing, government users have great flexibility in choosing the speed of the ATM service they need and can specify whether their applications will consist principally of variable bit rate (VBR) or constant bit rate (CBR) traffic.

Users that can accept the less deterministic VBR option will enjoy a price schedule that saves them 5% to 10% compared to CBR switching, which is generally required for voice and high-resolution video.

"It's a way to give a little bit of a price break to the data user," explained Geri Cerkovnik, a Bell Atlantic program manager.

Bell Atlantic's offering — which is limited to federal agencies in the Washington, D.C. region — appears likely to contribute to the armed forces' accelerating movement toward ATM transport in metropolitan- and, potentially, wide-area networks (*NW*, July 25, page 1).

Bell Atlantic's offering appears likely to contribute to the armed forces' accelerating movement toward ATM transport in metropolitan- and, potentially, wide-area networks.

Among the users that had been waiting for the carrier's filing is the Walter Reed Army Medical Center. The military's flagship hospital in the nation's capital has contracted for a network that requires medical images to be sent over the local and metropolitan areas in two seconds or less, said Lt. Col. Gary Gilbert, the hospital's director of information management.

Most of that time is required for archive retrieval, leaving less than one second for a 2M- to 4M-byte medical image to be transmitted, Gilbert said. Only ATM provides the bandwidth and the flexibility to provide this speed consistently, he said.

In consultations with Bell Atlantic officials before the tariff filing, Walter Reed officials stressed the need for flexible bandwidth requirements, Gilbert noted.

The tariff allows users to choose bandwidths from 1.5M to 155M bit/sec in increments as small as 500K bit/sec, although the access link to Bell Atlantic must be at least 45M bit/sec (see graphic).

If the user selects prices off the CBR schedule, the designated bandwith is a "peak cell rate," or maximum throughput, explained Curt Koeppen, director of federal military programs for Bell Atlantic.

If the user selects prices off the VBR schedule, the designated bandwidth is a "sustained cell rate," or average throughput, above which the user can burst for a nominal additional fee, he said.

The carrier filed a formal tariff rather than issue price sheets or specify rate ranges like some others (*NW*, July 18, page 1) because of government procedures, Cerkovnik said. "Predictability of pricing is a very important item because they're budget-constrained," she said.

The tariff does allow the government to authorize additional users under the price schedules.

In practice, that means interexchange carriers may be given the opportunity to buy off the schedule to connect government ATM users in Washington with those outside the local access and transport area, Koeppen said.

And the pricing scheme could serve as a model for a general rollout of ATM service by Bell Atlantic, Koeppen said.

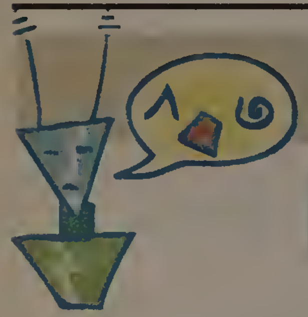
"The Bell Atlantic commercial side of the world will be filing [an ATM tariff] in 1995," he added.

To support the ATM offering, the regional Bell holding company has installed two AT&T GCNS ATM carrier switches connected by a Synchronous Optical Network backbone, Koeppen said. ◪

Bell Atlantic's scalable ATM pricing

Constant bit rate (CBR) service	Price per month
45M bit/sec access	
First 1.5M bit/sec	$2,000
Each additional 0.5M bit/sec	$60
Up to a maximum	$4,220
155M bit/sec access	
First 10M bit/sec	$4,100
Each additional 1M bit/sec	$70
Up to a maximum	$8,300
Variable bit rate (VBR) service	**Price per month**
45M bit/sec access	
First 1.5M bit/sec	$1,900
Each additional 0.5M bit/sec	$50
Up to a maximum	$3,750
155M bit/sec access	
First 10M bit/sec	$4,000
Each additional 1M bit/sec	$60
Up to a maximum	$7,600

Designated speeds under CBR service are peak cell rates, or maximum possible throughput. VBR figures are sustained cell rates, or average throughput; users can burst above designated rate for a nominal additional fee.



CyberSpeak: *Voices from the reader network*

Do you have a need for consolidating your voice mail, E-mail and faxes in a universal in-box?

◆ "This consolidation will be a requirement in the future. We implemented part of this capability in the late '80s and found it valuable. Most major vendors are working on implementing this. The benefits of convenience and reduced costs are real."

Russ Lipp, voice mail manager, Xerox Corp., Webster, N.Y.

◆ "For the folks that read *Network World*, if there is anyone out there that doesn't answer with an unequivocal, 'Yes,' you're either a network god or you're hiding under discarded XTs."

Charlie Smyth, research specialist in statistics, Department of Agronomy, University of Illinois at Urbana-Champaign, Ill.

◆ "We don't generate enough voice mail or faxes to warrant a universal in-box. Though the concept is definitely cool, it would be like taking everything you own on a weekend vacation when you only need two outfits and a swimsuit."

Antonio Tate, network administrator, University of Mississippi Medical Center School of Nursing

◆ "As an engineering services manager receiving roughly 25 messages per day, integrated voice would significantly streamline the annotation and delegation process.

"With integrated E-mail and voice, I'd anticipate a 5% to 10% productivity improvement for group managers and team leaders in this environment. There is a definite need for an integrated E-mail/voice mail in-box and, ultimately, for graphics/video integration."

Frank Sharp, group manager, Ilex Systems, Inc., Shrewsbury, N.J.

◆ "We need to consolidate E-mail first. With current technology, I'm stuck checking three different systems. Once I can stop checking three systems, then I'd love it if I could get all my E-mail from my voice mail and all my voice mail from my E-mail. I'd put faxes last on the list."

Timothy Chiu, technology marketing engineer, SynOptics Communications, Inc., Santa Clara, Calif.

Next Week

CyberSpeak Out!

The IETF has outlined its next-generation Internet Protocol (see story, page 1). How does it sound to you?

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LANNET goes to the air with new wireless spin-off

BY SKIP MacASKILL

Tel Aviv, Israel

LANNET, Ltd. this week is expected to spin off a start-up company that will develop wireless products for the local network and internetworking markets.

LANNAIR, Ltd., funded largely by switching hub vendor LANNET, will also launch its first product this week — a wireless Ethernet bridge with a range of 15 miles and no line-of-sight limitations.

The EthAirBridge (EAB) is a remote Ethernet bridge designed to interconnect network segments in environments where physical connectivity is impossible or pulling cable to link the sites is cost-prohibitive.

EAB will complement a line of LAN-based wireless devices — dubbed EthAirNet (EAN) — for PC-to-PC and PC-to-hub communications within a building. The EAN line will debut in the first half of 1995.

EAB consists of a radio receiver/transmitter from California Microwave, Inc., an Ethernet interface and LANNET's bridge software. Options include an RS-232 or V.35 interface port for dial backup.

The device can filter at 15,000 packet/sec, as well as automatically learn and maintain a table with as many as 4,096 addresses. It supports line speeds of up to 76.8K bit/sec, with an optional 4-to-1 data compression feature that increases throughput to 307.2K bit/sec.

EAB utilizes the Industrial, Scientific and Medical frequency band that operates in the 2.4-GHz range. It is based on a Frequency Hopping Spread Spectrum architecture that provides better security and noise immunity than traditional Direct Sequence schemes.

Unlike Direct Sequence, which spreads a radio signal across the available bandwidth, Frequency Hopping divides that bandwidth into 75 separate bands and "hops" the signal between them three times per second. This offers more security since the signal is harder to track and also helps maintain the integrity of the link since it is always moving to a free band.

LANNAIR, Ltd. miniprofile

Founded:
August 1994

Based:
Tel Aviv, Israel

Corporate status:
Privately held; funded largely by LANNET, Ltd.

Employees: 30

Primary products:
Wireless data communications devices

LANNAIR will target the device for use primarily in metropolitan-area environments where the use of physical connections between sites might not be feasible. It can also be used in disaster recovery situations, as a temporary communication link for a mobile office, to replace short-haul leased lines or for offshore communications in marine environments.

While the wireless market is beginning to take off in warehouses, classrooms and other sites, it has yet to mature, said Melinda Le Baron, a senior analyst at market research firm Gartner Group, Inc. in Stamford, Conn.

"Wireless use is growing, but it's still pretty much a niche technology," she said. "[There are a number of unresolved] bandwidth issues, and there is a need to educate users that it does not mean you're throwing data into the air so that anyone can grab it."

The 802.11 standard that addresses the 2.4-GHz range used by EAB "is also still in a state of flux, so users need to be careful," she added.

EAB is available now for $6,995.

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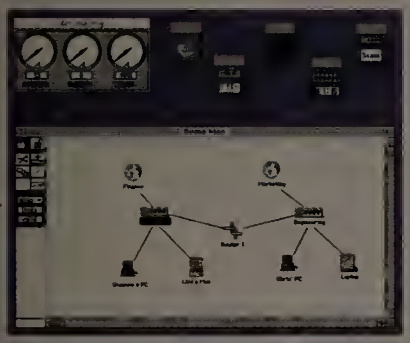
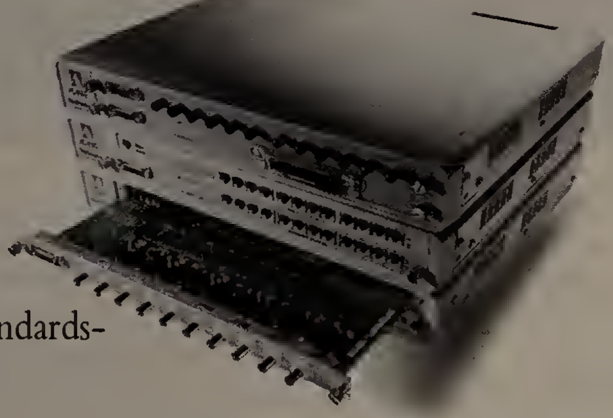


AsantéView network management software allows you to graphically monitor and control your network from either a Macintosh or Windows PC.

NetStacker is a stackable chassis that allows you to start with a few users and add expansion units as your network grows. Installation is easy using SmartSnap,™ a unique link that simplifies the connection of up to three units and avoids bus cables. Each unit features a dual segment backplane and two slots for your choice of optional modules. These include RJ-45, RJ-21, BNC and Fiber multi-port repeater modules as well as the Asanté NetConnect bridge module.

NetStacker can be managed using SNMP-based AsantéView™ or AsantéView Lite™ network management software. Both versions let you graphically monitor and control your entire network from your choice of a Macintosh® or Windows™ PC. And both offer powerful, standards-based solutions at a price to match your budget.



NetStacker's modules are all hot-swappable, so you can add or change them without powering down your network.

NetStacker from Asanté. The company known for simplifying networking is now making it a snap. Literally. Call us for more information and a primer on building an Ethernet network, 1-800-662-9686.

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ENTERPRISE INTERNETS

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NetLink switches to SNA/LAN market

Rolls out family of remote access switches, priority bandwidth mgmt. scheme.

BY MICHAEL COONEY

Raleigh, N.C.

NetLink, Inc. will take a giant step forward in the remote branch office communications game this week when it announces a switch that combines packet switching, routing and bandwidth management features in one aggressively priced box.

The firm, known for its Synchronous Data Link Control-to-Logical Link Control 2 conversion products, is branching out into the internetworking world with the announcement of its OmniLinx family of remote access switches.

The OmniLinx 6000 integrates LAN routing and packet switching technology that enables the device to send Systems Network Architecture/SDLC, asynchronous, Binary Synchronous Communications, Transmission Control Protocol/Internet Protocol and local network protocols from remote sites over frame relay or X.25-based backbones.

"Now we can guarantee delivery of SNA, LAN and other protocol traffic over a single frame relay connection in a more economic and less complicated way than a leased-line or router-based network," said Michael Bowman, vice president of marketing for NetLink.

The OmniLinx family will consist of more than three Reduced Instruction Set Computer-based models, although only the middle tier, OmniLinx 6000, will be announced this week. According to Bowman, there will be smaller and larger versions of the OmniLinx family, as well as other models, but plans have not been firmly set.

The OmniLinx 6000 supports a mix of two token-ring or Ethernet LANs and as many as four T-1 speed wide-area links. Users can increase the number of wide-area ports to support more lower speed lines, but throughput cannot exceed 6M bit/sec.

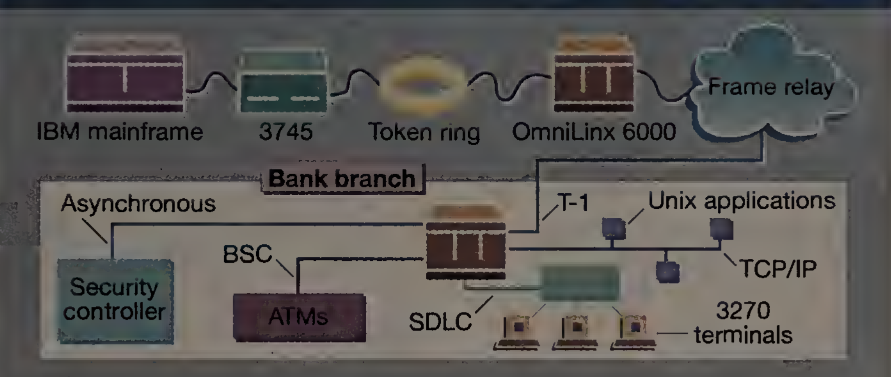
DON'T WORRY

Sitting in a branch office, the OmniLinx 6000 collects data traffic from a LAN, downstream frame relay net, SNA/SDLC and BSC devices. It encapsulates the data in a frame relay packet and switches it across the frame relay net to another OmniLinx 6000, which strips off the header and sends the data to its proper destination.

The switch family will be controlled by NetLink's new SmartStream software, which supports multiple transport classes, ensuring that SNA and other mission-critical protocols have top priority

See NetLink, *page 17*

Bankers' hours: typical OmniLinx banking application



NetLink's new OmniLinx access switch lets remote users blend, prioritize and switch SNA, bisynchronous, asynchronous and LAN traffic over a single link to a public or private frame relay net.

GRAPHIC BY TERRI MITCHELL

NETWORK MANAGEMENT

NetLabs shifts development focus to application suites

BY JIM DUFFY

Los Altos, Calif.

As part of a strategy to shift its focus from management platforms to applications, NetLabs, Inc. plans to bundle three existing applications into an integrated suite for receiving, correlating and responding to alerts from multiple kinds of net systems and devices.

NetLabs officials recently confirmed that, following major technology licensing pacts with network management market leaders Hewlett-Packard Co. and SunSoft, Inc., the company will wind down development of its DiMONS platforms and ramp up work on applications (*NW*, July 4, page 16). In so doing, NetLabs is acknowledging that it cannot compete with the likes of HP, SunSoft and IBM for management platform marketshare.

NetLabs' platforms will continue to be available from the company's 15 to 20 OEMs, including SunSoft, Siemens Nixdorf Information Systems, Inc. and 3Com Corp.

NetLabs' application initiative will center around three currently available packages: NerveCenter, NerveCenter/3G and NetLabs/Vision.

ALARMING RESPONSE

NerveCenter is an event correlation engine that filters, prioritizes, details and responds to alerts and alarms from managed devices on Transmission Control Protocol/Internet Protocol nets linking thousands of nodes. NerveCenter/3G is an event correlator for nets of hundreds of thousands of nodes. NetLabs/Vision is an application that lets users manage hubs, routers and bridges from a single station on the net.

NetLabs plans to offer all three products bundled together as a management application suite, much like Microsoft Corp. might lump together spreadsheet, word processing and database software as a business application suite. The software could run on top of a management platform, such as HP's HP OpenView or SunSoft's Encompass, or, for the time being, as a stand-alone management system.

"In some cases, it can run stand-alone because it has the underlying [platform] services," said Roselie Buonauro, NetLabs' vice president of marketing. "But over time, we see that really being applications that utilize some of the underlying platform services offered by HP or SunSoft. We really don't want to be in the platform business."

Using NerveCenter application program interfaces, users and third-party developers can add other management applications to the suite. One such application might be NetLabs' AssetManager, which keeps track of the system, application and net device inventory of an enterprise network. For example, when NerveCenter receives an alert from a device, it could automatically kick off AssetManager to determine the service and warranty history of that device.

NetLabs is also developing a library of "templates" for commonly used net devices that will provide "out-of-the-box" automated management. Such templates might automatically set security policies for systems, back up critical data at predefined time intervals and launch other management applications when event thresholds are approached.

Analysts believe NetLabs' strategy makes sense. "It's the only game they've got to play now," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo. "The platform business is pretty well over. And they've got some good ideas. The integrated application suites are on target. People want solution sets now; they don't want point solutions." ◘

BRIEFS

LanOptics, Inc. last week attacked the **Applicaton System/400 connectivity** market with a series of new concentrators and a new network management application.

The firm announced the 4Gx Star, an entry-level one- or two-port controller that supports seven to 14 5250 devices, respectively. Also, the company introduced the 4Gxi stackable hub, which supports 5250 communications along with one or two Ethernet and token-ring local-area network connections. For its StarNet 5250 controller, LanOptics added new modules that support connectivity for 14 5250 devices to as many as two hosts simultaneously.

Finally, the firm rolled out StarView Lite, a Windows-based Simple Network Management Protocol application that lets users monitor local SNMP devices on their net.

The 4Gx Star will be available in October for $500 to $950. The 4Gxi hubs are available now starting at $500. The StarNet modules are also available now starting at $800, and the StarView Lite program will be available in October for $500.

LanOptics: (214) 392-0847.

Digital Communications Associates, Inc. last week unveiled **Irma Workstation for Macintosh 4.0,** Macintosh-to-mainframe software that includes native mode support for Apple Computer, Inc.'s Power Macintosh platform and client support for Microsoft Corp.'s Systems Network Architecture Server, which is included in its Windows NT Advanced Server. Version 4.0 is available for $425. Current users can upgrade to the new release for $125.

DCA: (404) 442-4521.

IBM recently surprised most Wall Street analysts by announcing that its **second-quarter revenue** was up 2.7%, to $15.35 billion, compared to $14.9 billion in the same quarter last year. The results mean IBM has now been in the black for nine months, a sharp contrast to last year's $8 billion year-end loss.

IBM said it was more than halfway to its goal of cutting $7 billion in costs by 1996.

Meanwhile, IBM last week said it is providing the ground network management system for Mobile Communications Holdings, Inc.'s **Ellipso global satellite network.**

IBM was subcontracted by Westinghouse Electric Corp., which is the prime contractor for the Ellipso project.

The management system will be based on IBM's **NetView/6000 Telecommunications Management Network (TMN)** platform, a version of NetView/6000 that uses the Common Management Information Protocol. Westinghouse will develop management applications to run on NetView/6000 TMN.

Ellipso is a medium-earth orbit/low-earth orbit network that is designed to provide global voice and data communications to mobile and rural users. It will become operational in 1996.

End the long wait for reconnecting sessions

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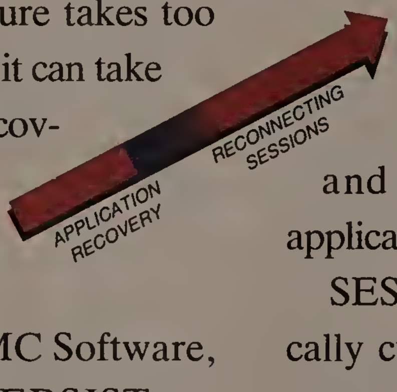

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Fujitsu launches ATM switch, video wares

BY MICHAEL CSENGER

New York

Fujitsu Business Communications Systems (FBCS), traditionally a private branch exchange vendor, has announced a customer premises Asynchronous Transfer Mode switch and a line of videoconferencing products for enterprise networks.

The E-7550 ATM Universe Switch can be used as a wide-area node or configured as a campus switch. Derived from Fujitsu Network Switching's FETEX-150 central office ATM switch, the 7550 is scalable from 2.5G to 5G bit/sec. It has eight slots for interface cards, each of which has four 155M bit/sec Optical Carrier (OC)-3 Synchronous Optical Network ports.

Fujitsu goes multimedia

E-7550 ATM Universe Switch
- 2.5G to 5G bit/sec throughput
- 8 slots, 4 ports each at SONET OC-3 (155M bit/sec)
- Pure ATM switch, no adaptation interfaces

ViewNet VS700S Series videoconferencing line
- VS700SP — Premier version with up to 1.5M bit/sec link
- VS700SR — Rollabout, standard version with up to 1.5 M bit/sec link
- VS700ST — Tabletop version with up to 384K bit/sec link

"It's designed to meet various target markets and can be configured according to the application and user needs," said Allen Brown, senior product manager.

The 7550 will be available for beta test early next year, supporting only the OC-3 ATM User-Network Interface. Support for T-3 links and switched virtual circuits is planned for later.

Integration of traditional voice, data and video traffic will be accomplished using equipment secured from ADC Kentrox under a new partnership also announced last week. FBCS will market and resell the ADC Kentrox ATM Access Concentrator-1, which supports 1.5M and 45M bit/sec ports and converts traditional types of network traffic into ATM cells.

FBCS executives said the new ATM offering fit well with the company's traditional PBXs in multimedia environments.

Brown could not, however, provide any details regarding the degree of interoperability and cohesion between the new customer premises equipment and Fujitsu Network Switching's current ATM offerings. The Network Switching division in Raleigh, N.C., offers the FETEX-150 and the SMX6000 ATM Service Multiplexer.

The SMX6000 is an access device supporting T-3 circuit emulation and T-1 Switched Multimegabit Data Services over carrier ATM services. Other interfaces, such as native local net, voice and video, are also planned.

Brown said the switches certainly will interoperate and that the question of integrated traffic management and flow control will be examined when the first switch arrives in Anaheim, Calif., next quarter.

The domestic business units have not cooperated closely in the development of the ATM products. Brown said all design decisions and architectural strategies are made by Fujitsu, Ltd. in Japan, with input from the American-based units limited to basic standards requirements.

A product manager at Fujitsu Network Switching said he was unfamiliar with details of the new switch and that FBCS was recently given responsibility for the 7550 because "their direct sales channels are better."

"Fujitsu faces the traditional problems of Japanese manufacturers entering this market, especially in their distribution channels," said Patrick Springer, senior consultant at CTG, Inc., a Waltham, Mass., consultancy.

The 7550 ATM switch configured as a wide-area node will cost $7,000 per port, Brown said, while workgroup versions will be competitive with the $1,000-per-port range of other vendors' equipment.

VIDEOCONFERENCING LINE

FBCS also announced the ViewNet VS700S Series, a videoconferencing product line consisting of three platforms: the SP, a room system with features such as the Picture-in-a-Picture composite-image screen that uses T-1 transport facilities; the SR, a rollabout model with a T-1 interface; and the ST, a tabletop model for small workgroups that can be used with 384K bit/sec links.

The SP and SR systems are available now, while the ST will arrive in the first quarter of next year. They are priced, respectively, at $39,000, $33,000 and between $17,500 and $22,000 for the ST.

☎FBCS: (714) 630-7721.

NetLink

Continued from page 15

across the backbone. It can also support SNA class-of-service mechanisms that prioritize different types of SNA traffic.

In the event of a permanent virtual circuit failure on the frame relay net, SmartStream will route around the failure to a healthy link.

Dynamic bandwidth allocation is also supported so that applications can get additional bandwidth on an as-needed basis.

OmniLinx and SmartStream include NetLink's SNA technology and a heavy dose of packet switching technology from Amnet, Inc., a fast packet/X.25 product developer based in Framingham, Mass. NetLink bought Amnet in May and is incorporating its technology into the new switches.

The OmniLinx, available this week, can be managed by any industry standard Simple Network Management Protocol-based manager, such as IBM's NetView/6000 or Hewlett Packard, Inc.'s HP OpenView.

"Presumably, these things are going to be in SNA networks, so I would expect NetView support will be added," said Lucinda Santisario, research manager of computing network architectures with International Data Corp., a research firm in Framingham, Mass.

Bowman said NetLink was looking at adding NetView support at a later time but did not say when.

A FORMIDABLE WEAPON

Analysts said NetLink is rushing headlong into a remote branch office networking fray laden with some heavy hitters such as Cisco Systems, Inc., Proteon, Inc. and Wellfleet Communications, Inc., as well as smaller players such as Hypercom, Inc.

"Users are increasingly realizing that router vendors don't handle legacy traffic very well — especially SNA and [BSC] — and NetLink is offering a solution for that problem," said Audrey Apfel, program director with Gartner Group, Inc., a consultancy in Stamford, Conn. "NetLink is also trying to offer branch offices — which are usually strained for bandwidth — a way to utilize what they have more effectively."

SCOTT McKIERNAN

BOWMAN

According to analysts, the NetLink OmniLinx will likely compete most directly against Hypercom and its Integrated Enterprise Network product family, which uses a combination of packet switching and time-division multiplexing to handle SNA and LAN traffic over frame relay.

The primary differences between the two are that the Hypercom box supports voice transmissions and NetLink does not. The NetLink box, however, costs $6,000 for a model that supports a single LAN and four WAN ports, whereas a similarly configured Hypercom solution, with a voice interface, costs about $12,500.

☎NetLink: (919) 878-8612.

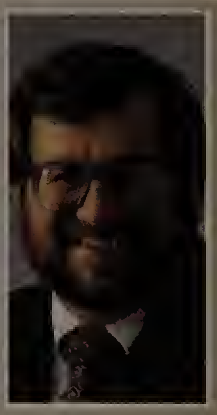
THE INTERNET

by Ed Krol

Spreading the networking word

Long ago, I was out to dinner with a group of scientists and engineers who were all bemoaning the fact that their kids had a pension for anything but science and engineering.

In similar fashion, I later found that no matter what I did, my daughter had no use for the Internet. In her view, it was strictly for geeks and nerds — I guess that says something, dad. Even my coming to the rescue by using the Internet to help with some school projects, which she forgot about until after the local library had closed, did not convince her there was something for her in cyberspace.



But times change, and my daughter has finally discovered the Internet. She wanted a logon not for the high-end applications that you read about in the media regularly, but rather for E-mail. She discovered that a number of people she had met and was corresponding with via the Post Office were accessible through E-mail.

On a separate front, twice a week I receive an E-mail of all the new networks joining the Internet. I scan the list just to get a feel for who is being connected and where the growth is happening. For many months, the majority of the growth has been in commercial connections, but there has also been a regular stream of elementary, middle and high school connections.

These two occurrences led me to the conclusion that since there was demand and opportunity, kids on the net must have finally reached critical mass. I was wrong.

Every summer I spend a week volunteering as a camp counselor for 55 junior high and high school kids. These youth, typically from middle class families of well-educated parents across the Midwest, spend a week on an island in Minnesota together. Many become fast friends.

I assumed that since my daughter was part of this demographic group and was motivated to acquire an E-mail address through our local freenet, many of the campers would have E-mail addresses. I suggested that when we produce the traditional camper list we include E-mail addresses. We asked, and three campers, all from Champaign-Urbana, responded.

The obvious thing I learned from this experience was that the market penetration of E-mail varies greatly from community to community. The big question it raised was, if all of these schools are networked, what are they doing with it? I talked to some people from the K-12 school networking community and found that in many cases, the net is used primarily for staff communication, professional development and lesson preparation.

Student access is not generally granted for two reasons. First, many of the teachers who are getting connected are not yet confident of their use of the net, so they are hesitant to frustrate students, as well. The other is logistical; computer use in schools is usually limited to the computer lab or library, which students may not generally use during the course of the everyday. Therefore, even if there is an option for a student to get an E-mail account, only the really motivated will take the offer.

But motivation is what this is all about. I was certainly disappointed by what happened at camp, but not sorry I tried. I was not doing it just for today, but was investing in the idea that E-mail was a useful thing for the future. Maybe only three kids had E-mail this year, but all the kids who didn't will go home remembering that other kids have E-mail. If they are presented the opportunity to get an account in the future, they'll likely grab it.

Next year, there will be nine campers with E-mail, the following year 20. At that point, we will have won. Campers will feel left out if they don't have an account. Rather than passively waiting for the opportunity, they will actively pursue a connection.

This subversive method of network promotion does not just apply to children. We should all do it in everyday life whenever we can. It's as simple as putting your E-mail address on your submission to the church bulletin or on your tag sale poster. It makes people aware that computer networking is not just something they read about in *Time* magazine — it is something available and useful to them.

➔ Krol is author of *The Whole Internet* (O'Reilly & Associates, Sebastopol, Calif., 2nd edition, 1994) and assistant director for network information services at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.

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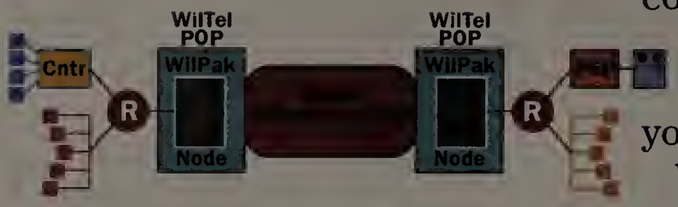

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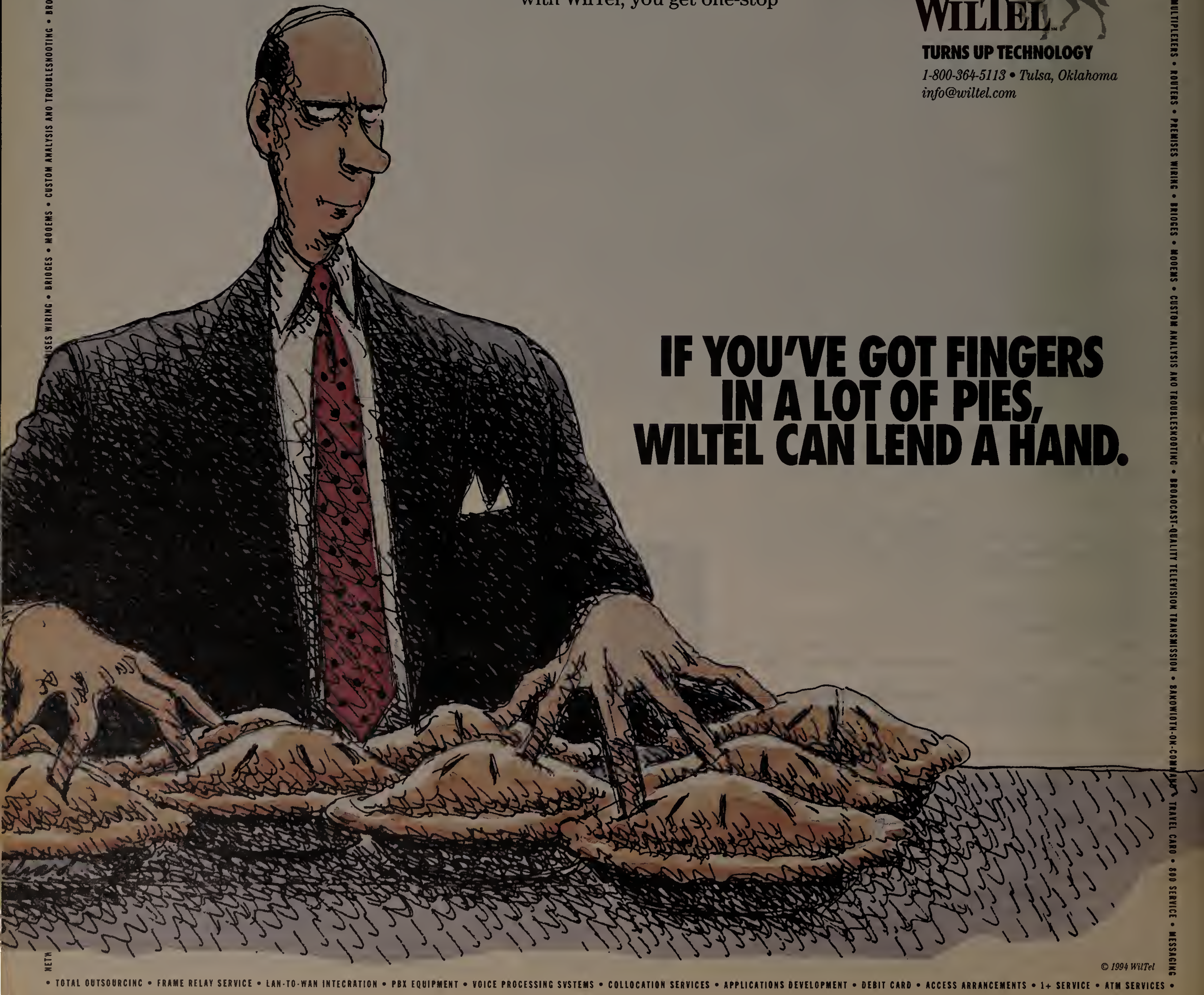

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LOCAL NETWORKS

Operating Systems, Management, Hubs, Adapters and Other Equipment

BRIEFS

Digital Equipment Corp. last week rolled out a new family of scalable disk and tape storage subsystems designed for Intel Corp.-based hardware running Novell, Inc. NetWare 3.1X and 4.0X. The StorageWorks **Redundant Array of Inexpensive Disks (RAID)** Array 210 is a controller-based disk array that comes equipped with three 1.05G- or 2.1G-byte disks and room for three additional disks.

Available now, it costs $6,999.

The StorageWorks TZ87N family of digital linear tape subsystems for NetWare is available in a single-cartridge model that offers up to 10G bytes of storage capacity and a five-cartridge version providing up to 50G bytes of storage.

Available now, it is priced between $4,999 and $9,999.

Digital: (800) 786-7967.

Compatible Systems Corp. last week unveiled the MicroRouter 1000R, a **dial-up remote access Ethernet router** that allows end users in branch offices to access corporate network resources over a Point-to-Point Protocol serial line connection.

The device includes one Ethernet port and one RS-232 wide-area port at speeds up to 128K bit/sec.

The router, which supports the Internet Protocol, Novell, Inc. Internetwork Packet Exchange (IPX), AppleTalk and DECnet protocols, costs $1,695 and is available now.

Compatible Systems: (303) 444-9532.

The Tolly Group last week announced that Madge Networks, Inc.'s SmartCAU Plus controlled access unit has been certified for compatibility and conformance with the token-ring network management extensions implemented in IBM's **LAN Network Manager 1.1** software package.

The Tolly Group: (908) 528-3300.

Kalpana, Inc. last week introduced a reseller certification program that will identify resellers with the technical competence and resources to provide its EtherSwitch end users with post-sales **service and support.**

To earn Certified Support Partner (CSP) designation, resellers must demonstrate technical skill in designing, implementing and servicing networks based on the EtherSwitch as well as have at least one Certified EtherSwitch Engineer (CEE) on staff.

A CEE is a field engineer who has completed Kalpana's certification course. Currently, 22 of Kalpana's resellers have been prequalified for CSP status by the company.

Kalpana: (408) 749-1600.

SynOptics Communications, Inc. last week reported **revenue** of $168.7 for its second fiscal quarter ended July 1, a decrease of 6.3% from the $180.1 million it recorded in the second quarter last year.

Earnings fell 34.3% from $24.5 million in last year's second quarter to $16.1 million in the second quarter just ended.

NRC rolls out Ethernet switching hub

New device features gigabit-speed backplane, routing and media choices.

BY SKIP MACASKILL

San Jose, Calif.

Network Resources Corp. (NRC) last week extended its line of integrated routing hubs to include a switched Ethernet model with a gigabit-speed backplane and choice of media interface at each port.

The MultiGate Hub 3s is a 12-port switch that provides dedicated 10M bit/sec bandwidth to Ethernet segments, high-end workstations and critical net resources.

The switch is designed so that users can select from a 10Base2, 10Base-T or 10Base-F interface at each port.

This enables users to support existing coaxial cable installations as well as fiber runs to distant segments or resources within the same device.

The switch is positioned as a hub of hubs, as it supports thousands of media access control layer addresses at each port. Users can deploy it to provide switching between 10Base-T workgroup hubs.

The device also offers a high-speed backbone port, which can be used to link the hub to a corporate backbone network or server cluster.

Initial interfaces for that port — available by year end — will support Fiber Distributed Data Interface and both the 100VG-AnyLAN and 100Base-T standards for 100M bit/sec Ethernet.

Interfaces supporting Asynchronous Transfer Mode at speeds up to 622M bit/sec will follow in 1995 — that is why the box features a 1.2G bit/sec backplane from the outset.

"At first glance, a 1.2G bit/sec backplane seems like overkill for an Ethernet switch with 12 ports, but it allows the box to scale to higher speed technologies as users' network needs change," said Jeff Wilbur, vice president of marketing at NRC.

"We wanted to provide enough processing power and bandwidth so users can move data around their network where needed in the most efficient way," he added.

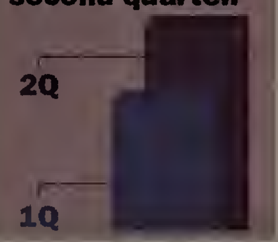
The MultiGate 3s is powered by two Motorola, Inc. 33-MHz 68040 processors, which will be used to support an integrated routing feature scheduled for year-end delivery as a software upgrade.

Network protocol support will include the Internet Protocol, Novell, Inc. Internetwork Packet Exchange (IPX) and AppleTalk, with forwarding rates of 14.8K packet/sec.

The integrated routing support will allow the device to compete with other Ethernet switches featuring that capability, including Alantec Corp.'s PowerHubs, Standard Microsystems Corp.'s EliteSwitch/1 and 3Com Corp.'s LANplex offerings.

The device features a Simple Network Management Protocol agent that supports a variety of Management Information Bases, including one for bridges and another with NRC's private extensions. The MultiGate 3s can be managed via NRC's MultiGate Manager software running on a Macintosh or any third-party SNMP-based net management package.

In the first quarter, 49,400 Ethernet switch ports were shipped, according to market research firm Dataquest, Inc. It estimates that about 50% more ports were shipped in the second quarter.



SNMP MANAGEMENT

The hub is available for $7,995. The 10Base2 and 10Base-T port modules cost $395, and the 10Base-F module costs $395.

A fully configured MultiGate 3s will cost between $860 and $1,000 per port, making it a bit pricey, according to Tam Dell'oro, senior industry analyst at consultancy Dataquest, Inc. here.

"The price is little high, which is likely a result of the high-speed backplane and per-port media choices the device offers," according to Dell'oro. "Allowing users to mix and match connections at the port level is a nice feature because it gives users a lot of flexibility when configuring their network. For a fixed-port hub, the device appears to offer a lot of functionality."

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CONNECTIVITY OPTIONS

Macintosh products debut at summertime Apple shows

BY ROCHELLE BRODER

San Jose, Calif.

Routers, remote access devices and security products are among the Macintosh connectivity wares rolled out or being rolled out at this summer's trade shows for Apple Computer, Inc. computer users.

The Mactivity show was held here two weeks ago, while the MACWORLD Exposition will be held in Boston this week.

- Digital Ocean, Inc., based in Lenexa, Kan., will demonstrate at MACWORLD two new wireless Ethernet products: the Starfish Ethernet Access Point and the Manta Ethernet wireless station.

The Starfish Ethernet Access Point is a wall-mounted device that gives wireless users in and out of the office access to local wire-based Ethernet local-area nets via AT&T's WaveLAN spread-spectrum radio technology.

The Manta Ethernet wireless station is an external card for Apple's PowerBook 500 notebook computers that allows users to access the corporate LAN via the Starfish access point.

Macintosh lineup

	Price	Availability
Digital Ocean Starfish Ethernet Access Point	$1,850	Oct. 1
Digital Ocean Manta Ethernet wireless station	$699	Oct. 1
Digital Pathways ARASNK	$85	Now
International Transware TransTalk MP	$1,799; $299 for upgrades from TransTalk	Now
Webster Software Pack 2.6 for MultiPort/LT	Upgrade free; $1,995 for MultiPort/LT	Now
Webster Software Pack 2.7 for MultiPort/LT	Upgrade free	September

The Manta card is the newest in a line of wireless adapters for Apple computers from Digital Ocean. Its previous cards were called Groupers.

- At Mactivity, International Transware, Inc., based in Mountain View, Calif., announced support for AppleTalk on its TransTalk MP router.

The device will allow communications between LANs based on AppleTalk and other net protocols, including Transmission Control Protocol/Internet Protocol and DECnet.

The router also will let users encapsulate TCP/IP and DECnet within AppleTalk.

- Digital Pathways, Inc. introduced its ARASNK Defender remote dial-in security program for the Macintosh at Mactivity/CEO.

The software runs on a remote computer and lets a Digital Pathways Defender 5000 authentication device that resides on the corporate network intercept and verify server access attempts by Apple Remote Access clients.

- Also at Mactivity, Webster Computer Corp. demonstrated new software for its MultiPort/LT, a combination Ethernet gate-

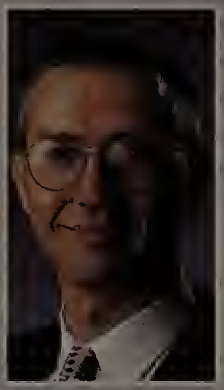
See Macintosh, *page 20*

NET RESULTS

by Mark Gibbs

Disposing of the dead whales in your organization

One of my favorite stories is how the Oregon Highways Department attempted to dispose of a whale carcass that washed up on a beach.



Why the Highways Department should have been given this task in the first place is unclear. Obviously more familiar with objects that spend most of their time on land, it never occurred to the department to simply tow the whale out to sea.

Nope. To the Highways Department, the obvious solution was to blow up the whale and let the sea gulls deal with the fragments.

So department employees marched down to the beach, accompanied by a crowd of onlookers, and placed a rather large quantity of dynamite around the deceased cetacean. Then everyone retreated up the beach, and the Highways Department triggered the dynamite.

There was an enormous bang, a huge ball of flame and smoke, and an "Ohhhh!" from the crowd.

But then the fault in the whole idea emerged. The "Ohhhh!" suddenly turned to "Arggghhhh!" as large chunks of blubber rained down.

Apparently there is a videotape of this event, and at this point, the picture goes red. There is a loud squelching sound followed by a cry of — expletive deleted — from the cameraman.

A car located about a quarter-mile from the site had its roof caved in by a fragment. And the cleanup crew, the sea gulls, were nowhere to be seen.

Meanwhile, "condominium-sized" bits of whale were left on the beach.

Now, you may well ask, what has this to do with networking?

Well, as I see it, this situation is rather similar to the way some organizations deal with legacy systems.

When you downsize (or for you politically correct people, right-size), you are trying to dispose of something that your organization considers to be a dead whale.

Legacy systems are often large, unwieldy and slowly rotting. But getting rid of them is hard. If you try to replace them too quickly and rush in network-based replacement systems, you'll wind up with something that looks like that Oregon beach.

You'll have a lot of stuff to clear up, and you'll still be left with big-iron applications (the condo-sized chunks) that have no counterpart on the network.

The whole key to reengineering the organization is strategic planning. There are a number of ways to go about this, including the use of a cool tool I've recently come across.

It is called ABC Toolkit For Total Process Management and is published by Micrografx, Inc. This is a slick business graphics package that includes tools for creating process flow charts, analyzing processes and producing reports.

The package also includes a very good book on the subject of reengineering called *Eating the Chocolate Elephant* by Mark D. Youngblood.

This book provides an introduction to Total Quality Management — a synthesis of the concepts of total quality management and benchmarking with process reengineering techniques.

If you are in the process of figuring out what to do with your dead or moribund "whale," this package is a great foundation with which to build a strategic plan.

And it is a lot less messy than dynamite.

➾Gibbs is a consultant and writer in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

Macintosh

Continued from page 19

way, LocalTalk router and remote-access server.

The new Software Pack 2.6, an upgrade that runs inside the MultiPort/LT and on the systems administrator's computer, includes enhanced Zone Group support, new password options, roaming callback operations and new configuration features.

Network administrators can now create Zone Groups that define what net resources users can and cannot access.

In addition, the network manager is able to place a limit on the amount of time that individual users can be connected to the network remotely.

CALLBACK AUTHORIZATION

A new callback authorization feature lets a user call in, establish a connection, enter a password and then disconnect. The MultiPort/LT then calls the user back to confirm authorization.

Webster Computer also announced its licensing of the PortShare Protocol from Stalker Software, Inc.

The company said it plans to integrate this technology's Dial-out capabilities into MultiPort/LT, which will enable users to dial into CompuServe and other net services via the gateway.

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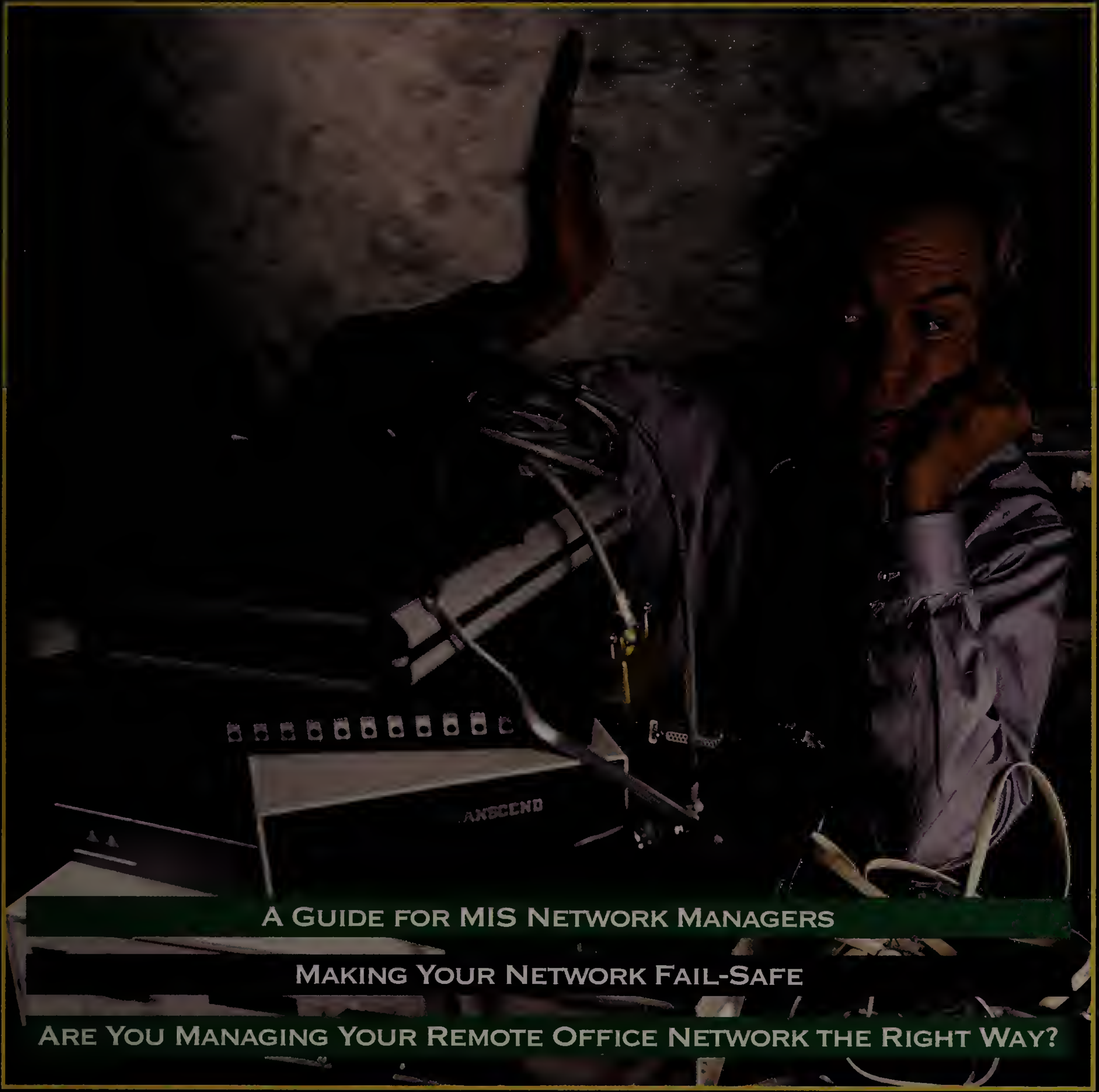
HOW TO MEET THE CHALLENGES OF

Remote Office Networking



A GUIDE FOR MIS NETWORK MANAGERS

MAKING YOUR NETWORK FAIL-SAFE

ARE YOU MANAGING YOUR REMOTE OFFICE NETWORK THE RIGHT WAY?

A CROSSCOMM CORPORATION ADVERTISING SUPPLEMENT

Dear MIS Executive

THE REMOTE OFFICE ENVIRONMENT

- computers everywhere
- multiple vendors
- multiple applications
- multiple protocols
- multiple management systems
- rapid technological change

THE MIS CHALLENGE

- no accurate network map
- don't know who is connected where
- don't know who is using the network
- no early warning systems
- problems happen all the time
- problems are difficult to isolate and fix
- lack of sufficient in-house expertise
- remote sites without technical staff

yet...networks must support mission-critical business applications

If your business applications are taking you to client/server computing, then before long you will be faced with the challenge of deploying PCs, LANs, and LAN-based applications to your company's remote locations. Even if your company has ample LAN experience with corporate office networks, the challenges of remote office networking will test its limits. I say this from experience, for I have visited hundreds of companies and met with hundreds of MIS executives, and CrossComm has helped to connect thousands of networks worldwide. I find that companies are surprised by—and often unprepared for—the reality of remote office networking.

The purpose of this document is to share with you my own and CrossComm's experiences, in the hope that your venture into remote office networks for client/server computing is a successful one.

DATA CENTER AT EACH REMOTE OFFICE

A typical remote office contains a number of PCs and other pieces of equipment connected to each other to form a small network. Every PC is a standalone computer and, by mainframe standards, not a very reliable one at that. By connecting the PCs and file servers to a LAN, you end up with a distributed computer system to which you'll connect the legacy SNA equipment, a router, a CSU/DSU, and possibly other equipment. Add to this a few different protocols and a few software applications, and you've got a mini-data center in *each* office. If the number of data centers doesn't worry you, the fact that there is no technician on-site should, especially if your network will contain hundreds or thousands of such "data centers."

NETWORK CHAOS

What makes client/server networks possible are the new networking technologies and the existence of standards. The latter fosters healthy competition among vendors that specialize in order to be competitive. However, you typically buy PCs, LAN adapter cards, LAN hubs and MAUs, PC software, networking software, application software, routers, CSU/DSUs, WAN service, and network management all from different vendors. After all, standards assure interoperability, right? Well, maybe, if technology stands still. But that's not the case. Every vendor frequently adds features through new software and hardware releases. Every vendor produces maintenance releases that fix bugs (yes, every product has bugs). Fundamental technologies change constantly, too.

While price/performance is always improving—which makes your networks run cheaper and faster—network complexity is also increasing. Combine this complexity with constant user adds, moves, and changes, and you have a formula for failure waiting to happen.

Network failures do happen, and in fact they happen all the time. Unfortunately, problems first crop up as symptoms, the source of which is unclear. For example, users complain that response time is slow, they can't log on to the server, they can't send mail, etc. In client/server networks, the symptom can come from one remote office, but the cause may be somewhere else. This didn't happen with

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legacy/SNA networks. Finding and fixing a problem such as this is a real challenge. But just because you know what's wrong doesn't mean you can fix it easily.

It's amazing—most companies I visit don't have accurate maps of their networks. Even those that make the attempt, soon give up, because as soon as a map is drawn, it's obsolete. I always ask MIS managers if they have a network inventory, if they know who is connected to which network, who is using the network, or if they have any idea when they'll run out of bandwidth. Each time the answer is, "No, but we'd sure like to." A VP of MIS of a large East Coast bank told me that his biggest worry is that when a network component fails and his people replace it with a spare, the network will crash because the spare is a revision or a release out of date and no longer interoperable with what's on the network.

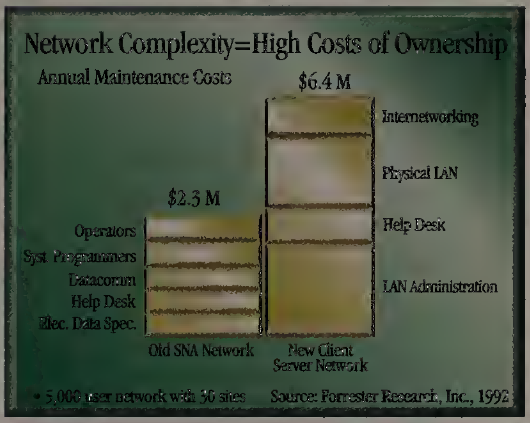
Even that worry is modest compared to what happened recently to one major customer. One weekend the network went haywire when they tried to add a few more routers to their network. After a frantic three days when everybody was looking for the "problem with routers" the true culprit was found: a print server. Quickly, a software fix was obtained from the server manufacturer, but when the technicians went to install it on the faulty print servers, they could not find them all. No one knew for certain how many of them were on the network and where they were located.

HIGH COST OF MAINTENANCE

The complexity of client/server networks, combined with hundreds of remote offices, creates a massive support issue for the MIS department. I recently met with a senior executive at a major bank who told me about his plans for building a 1,200-branch office network, and that the consultant he hired recommended budgeting *25 percent of one technician's time for each location. That meant hiring 300 people*—a prospect not cherished by anyone. But as obvious as it is, not everyone sees the folly in this plan. A few months ago a major corporation issued a request for a proposal to connect thousands of remote offices with routers. They made it clear that they wanted to pay only $1,000 per router; the lower the price, the better. Service and management, two essential items for a successful strategy, were downplayed. A simple calculation shows that with a five-year depreciation schedule, the annual router cost is only $200. However, one service call per year to each branch costs several times more than that.

The cost of maintaining a client/server network is much higher than that of maintaining a similarly sized SNA network, as is illustrated in the accompanying chart, a study by Forrester Research (see Figure 1). *The cost of maintenance dwarfs the cost of equipment.* Another study by Gartner Group estimates that the annual per-user cost of maintenance and administration is $1,425 (see Figure 2). For example, someone building a network of 5,000 users could spend as much as $500,000 on the acquisition of routers alone, which translates to $100,000 per year, assuming a five-year depreciation—compared to $7,000,000 per year for all other ownership costs.

The cost of maintenance is only one factor in maintaining a remote office network. Staffing is another. Just imagine sending one of your technicians or your service provider's technicians to a remote site to fix a problem. He or she must have expertise in diagnosing PCs, LAN adapter cards, PC software, network software, application software, LAN hubs/MAUs, routers, routing protocols, SNA hardware and software, CSU/DSUs, and WANs. How many technicians do you have who can do all that? The lack of qualified personnel results in your valuable techs working long hours and possibly burning out—the consequences of which all managers dread.

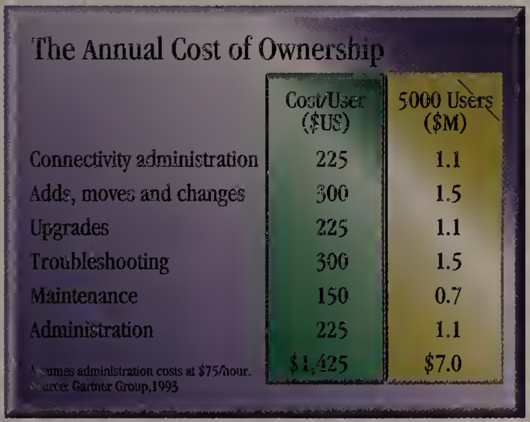


• 5,000 user network with 30 sites Source: Forrester Research, Inc., 1992

Figure 1

THERE ARE SOLUTIONS

Despite these difficulties, remote office networks are a good thing, and most corporations use them to run mission-critical business applications. How do you do it right and avoid the pitfalls? As the founder and president of CrossComm, a company that helps build such net-



The Annual Cost of Ownership

	Cost/User ($US)	5000 Users ($M)
Connectivity administration	225	1.1
Adds, moves and changes	300	1.5
Upgrades	225	1.1
Troubleshooting	300	1.5
Maintenance	150	0.7
Administration	225	1.1
	$1,425	$7.0

Assumes administration costs at $75/hour.
Source: Gartner Group,1993

Figure 2

works, I have seen many networks done properly—and many that weren't. Our experiences at CrossComm led us to a solution that attacks the network maintenance problems and costs head-on.

Several years ago, CrossComm rolled out a router product line that found great acceptance in commercial networks designed for running mission-critical applications. I quickly realized that we were having trouble supporting the installed base with the quality of service we and our customers expected. Service requests outnumbered qualified technicians. No matter what was wrong, they all called CrossComm.

We decided to do something different. We used the "plan for problems" approach. We could hope for customers without problems, but that is impossible. Instead, we assumed *problem solving is the key to the product* that we must deliver. Consequently, we decided to fight the support problems caused by technology *with* technology. Many vendors know how to build a router, but success can only be achieved by advancing beyond basic technology. First, it meant designing products that put service and management above all else. While it sounds obvious, most technology companies, including ours initially, do the opposite. Then, it meant designing Virtual On-site Technology (VOT) to start solving problems remotely. You'll read more about it in this supplement.

Today, we service thousands of customer locations worldwide, and we enjoy a reputation of having the best service in the business. Our customers are happy; they too use VOT. Of the service calls received by CrossComm, more than 50 percent are not router related. Further, more than 90 percent of these calls can be solved without the expense and delay of sending someone on-site. Finally, by using VOT, we achieve a ratio of more than 500 routers per network support engineer, and have been rated by customers as the best service provider in the industry.

The following two sections are intended to help you design remote office networks with the philosophy of *plan for the problems*. This means a proactive design that we call Fail-Safe Networking and rapid response to network problems using VOT. I hope you'll find it useful.

Sincerely yours,

Tad Witkowicz
President & CEO
CrossComm Corporation

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How to Design a Fail-Safe Remote Office Network

Like a chain, a network is only as strong as its weakest link. It is unreasonable to interconnect LANs into a remote office network and expect it to work perfectly 100 percent of the time. It is inevitable that one piece, somewhere, will fail. However, it is now possible for the network manager to have a fail-safe remote office network.

Fail-safe means that there is no single point of failure. In a fail-safe system, if a problem occurs, it is contained to only a small part of the network, and the network can recover to its functional state quickly. Creating a fault-tolerant network by installing two of everything usually isn't economical. Let's look at how to achieve the highest possible degree of fail-safe operation at a reasonable cost for the three components of a remote office network: the central site backbone equipment, the wide area network (WAN), and the remote office.

The Fail-Safe Backbone

The backbone router plays a key role; one or more of these routers usually connects the data center to all the remote offices. If this router fails, all remote offices lose access. The backbone router, then, must not have *any* single points of failure. Historically, routers designed with a traditional bus architecture contain many single points of failure. One way to avoid this is to deploy a backbone router designed with a parallel router architecture. Figure 3 shows an example of such an architecture.

A parallel architecture means that multiple router modules operate simultaneously, yet independently of one another. Each router module contains its own CPU, packet switch, and input/output ports. If one module fails, the other routers continue to operate without disruption. This enables the failed module to be swapped while the rest of the unit remains on-line.

Another aspect of the architecture is that a backbone router is equipped with redundant, hot-swappable power supplies and fans. Failed units can be replaced while the router continues to run. In addition, load-sharing power supplies distribute the load across multiple supplies to extend their longevity. Fans should have sensors so that an alarm is sent if one of them fails or if the router becomes overheated.

The Wide Area Network

A fail-safe WAN topology incorporates several key components: multiple paths, rapid recovery from line congestion and failures, traffic prioritization across both the LAN and WAN, dial backup, and elimination of non-essential broadcasts.

Figure 4 includes a mesh network topology that employs multiple, dedicated links. This eliminates a single point of failure since an alternate path is available if one link fails. The dashed lines represent dial backup, an inexpensive way to create emergency connections via the public telephone network.

A fail-safe WAN is as dependent on the routing software as it is on alternate links. Prioritization based on both the type of protocol and its timeout sensitivity significantly affects WAN performance. For example, SNA sessions disconnect if the traffic is not delivered within 10 seconds. Nondisruptive rerouting rapidly redirects traffic to an appropriate path upon detection of congestion or link failure. Finally, broadcast storms from NetBIOS and other protocols can quickly overwhelm available bandwidth, and thus need to be minimized.

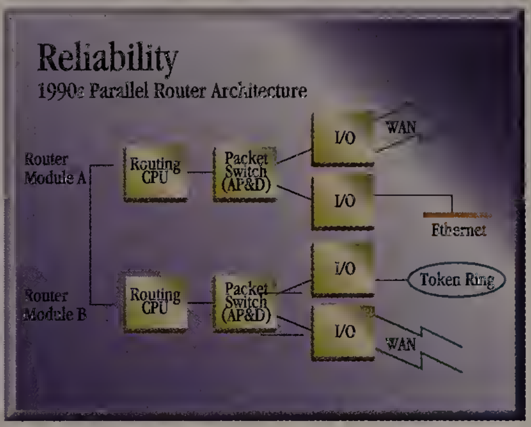
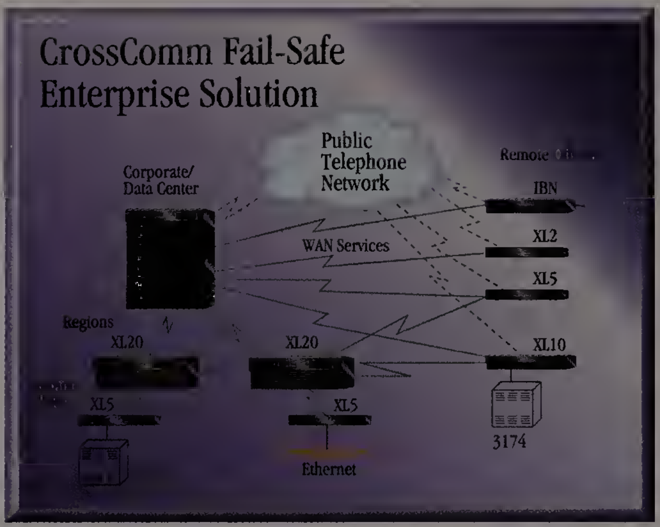


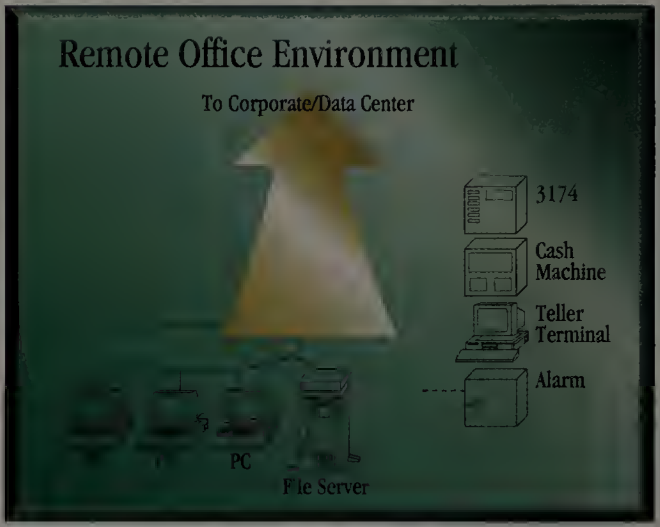
Figure 3

Another interesting feature of a fail-safe remote office network is dial backup. Dial backup is exactly what it sounds like; in the event of a WAN failure, a router can use dial backup to dial the data center over the



CrossComm Fail-Safe Enterprise Solution

Figure 4



Remote Office Environment

Figure 5

public phone network. The usefulness of such a feature, one might imagine, pays for itself even after one outage.

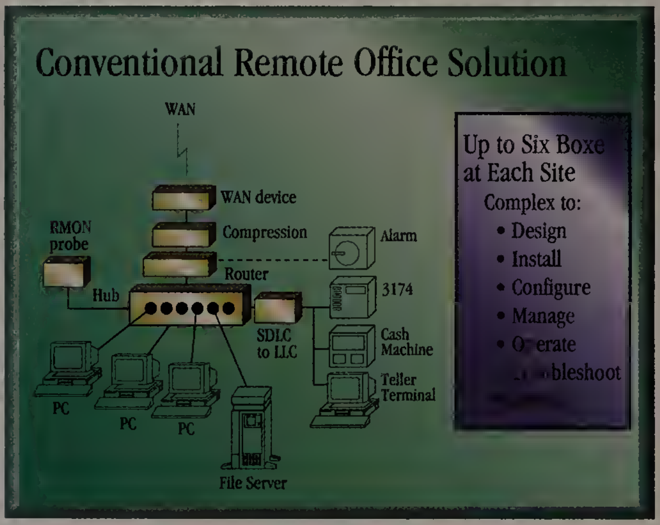
The Remote Office

The remote office challenge is exemplified by Figure 5, an illustration of a typical remote site. Several applications at the remote site may involve, for example, SNA controllers and specialized gear such as cash machines, in addition to LAN equipment. This configuration forms a small network that needs to be connected back to the data center.

In the past, the most common remote network involved separate pieces of equipment—the router, hub/MAU, DSU/CSU, SDLC-to-LLC converter, plus a separate RMON probe or compression box, if desired—purchased from different vendors. Each was managed by a different system. Each had cables connecting to other boxes. The result was a very complex remote network to install, operate, and troubleshoot. It contained many single points of failure. Imagine this scenario replicated across hundreds of branches. Figure 6 shows this type of solution, which is promoted by some router vendors.

A fail-safe remote solution should minimize failure points and expedite remote problem identification and resolution. The obvious answer is to integrate the remote network functions into a single unit that can be managed remotely by a single system (Figure 7) and serviced by a single vendor. This will tremendously simplify the critical challenge of maintaining remote connectivity. It also guarantees that the functions interoperate. Built-in remote management that simultaneously addresses all capabilities greatly reduces downtime exposure. The savings in response time and administration costs are substantial.

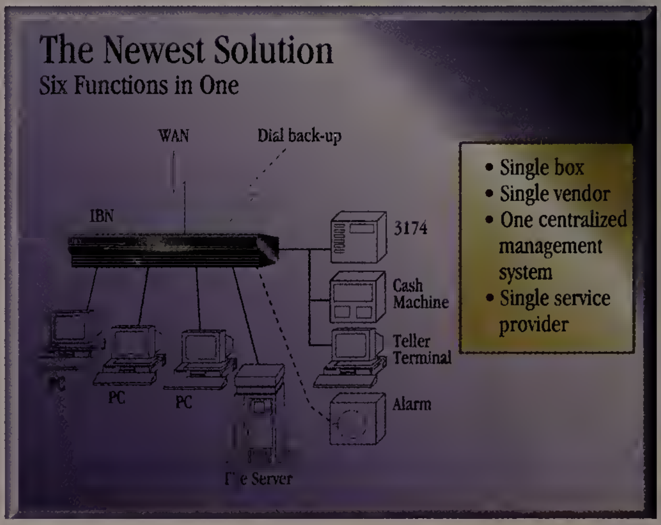
Remote sites represent the potential Achilles heel in a remote office network. It is critical to gain as much control as possible over these sites by simplifying their implementation and management. This can be accomplished through integration and an end-to-end management capability.



Conventional Remote Office Solution

Up to Six Boxe
at Each Site
Complex to:
- Design
- Install
- Configure
- Manage
- Operate
- Troubleshoot

Figure 6



The Newest Solution
Six Functions in One

- Single box
- Single vendor
- One centralized management system
- Single service provider

Figure 7

How to Manage Remote Office Networks

Even when we can install a fail-safe remote office network, it's only half the story. Now how do we manage it?

Network management must be the most overused and ill-defined term in the industry. Most vendors use this term when referring to software that manages their specific pieces of equipment. MIS professionals, on the other hand, think in terms of a single station that manages the network and all the devices in it—without proprietary problems. While single station management is not the norm, today's network management standards are at least a light at the end of the tunnel for beleaguered MIS professionals. HP OpenView and IBM NetView 6000 platforms have emerged as the leading industry standards.

WHAT'S IMPORTANT?

Remote office networks require a significantly different approach to network management than networks inside buildings or on an industrial campus. The following are the key differences:

Remote Access: With hundreds or thousands of remote office LANs to support using traditional methods, you need an army of highly skilled technicians loaded with expensive test equipment running around the country fixing problems. The required expertise and sheer number of people make this approach totally impractical. Turning to system integrators and outsourcing companies doesn't help. Many integrators have the people, but not the required expertise. And this still does not eliminate the cost and time of travel to remote sites to solve problems. The ideal solution is to diagnose and resolve a remote office problem without traveling there. This is how you can leverage the people in your organization with the highest skill levels and the most knowledge.

Remote Diagnostics: Diagnosing a remote office problem means much more than collecting statistics from a router or hub, which is what you get from most router and hub vendors today. It means being able to see right down to the endstations: every PC, file server, or gateway anywhere in the network. If a user reports, "My response time is slow, and I'm not doing anything different," the network engineer must be able to:

- measure WAN link saturation and delay;
- see all traffic on the remote LAN;
- capture and decode packets sent by the user's PC;
- trace the packet through the network; and
- look at the application and configuration information inside the packet, etc., to find out the cause of the delay.

Is it the LAN or WAN congestion, misconfigured PC LAN driver, wrong version of the application software, conflict with a gateway somewhere else in the network, intermittent WAN or LAN cable, or a score of other causes? The technician needs to see everything at the remote site as if he or she were there with a WAN datascope and a LAN analyzer.

Remote Administration: Your network management software should let you keep track of network inventory. This means automatically discovering which computers are connected to which remote LANs, detecting and tracking adds, moves, and changes, and keeping track of your network map. This is critical to network uptime. Imagine a user, Wendy Smith, calling with a complaint that she can't log on to the payroll server. How do you find Wendy and the server? You also need to track network usage, WAN utilization, network alarms and events, error conditions, set up thresholds for various network occurrences, and more.

EXPLOITING THE ROUTER

Clearly, getting information or diagnosing a problem at a remote office without going there is desirable. The question is how to do it. The answer lies in the remote router.

There is an inherent challenge in a remote office network: tech support isn't where it's needed. But as shown in Figure 8, a remote office router is in a position to see everything you need to manage and maintain a remote office network. It can see who is active on the remote LAN and what traffic is sent where. For example, the router can see the traffic exchanged between remote user C2 and the remote file server FS. It can see all the packets sent and received by the user C1 and the 3174 controller, and it can see the direction these packets were sent. The remote router can also see all the WAN traffic. It is easy to imagine how such a router could provide remote LAN inventory, capture LAN packets or WAN data for diagnostics, collect LAN and WAN usage and send all that information--when needed--to the data center for viewing by the network technicians.

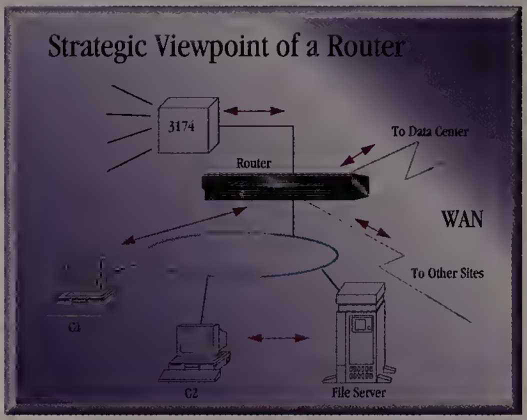


Figure 8

While the router is in the position to see the information, most routers on the market today don't have the software or the necessary CPU power to see and use the information.

NETWORK MANAGEMENT STANDARDS

When selecting remote office networking components you must be mindful of the network management standards. The key standards you will hear about the most are Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON). Just because a device supports one or both of these standards doesn't mean that you get network management. The two standards simply define the way management information is collected and stored in a device such as a router or hub.

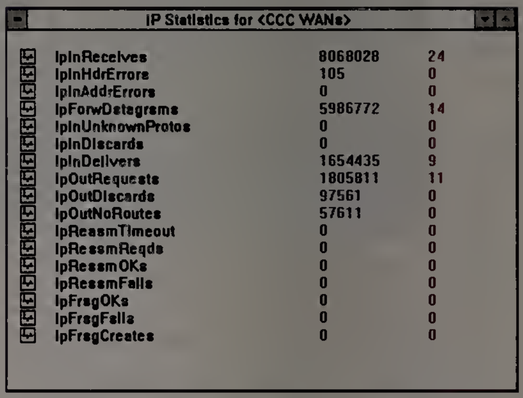
The best way to explain SNMP and RMON is to use the analogy of a filing cabinet in your office. While everyone has filing drawers, not everyone files information in the same way. Just think about finding a memo in someone else's cabinet. The network management standards define how network management "filing cabinets" should be organized so that anyone (any network management workstation) can find information easily. The SNMP standard defines a relatively limited set of network management data called MIB I and MIB II (Management Information Base extensions). RMON goes substantially beyond the SNMP MIBs and covers categories of management data that are particularly useful in remote office networking.

While standards define how to find management data in the "filing cabinet" of the router or hub, they do not specify what to do with it. In principle, any network management station can read the SNMP or RMON data, but the data's usefulness rests in the way it is presented to the user. An example of a network management screen displaying SNMP statistics collected on a TCP/IP device is shown in Figure 9.

Management information presented in such a way is hard to use and interpret. Properly designed network management client software (running on a network management workstation) will take the raw SNMP and RMON data and display it in a fashion that is much more useful, as shown in Figure 10.

WHAT TO EXPECT

Today most network management software provides network information such as traffic statistics, graphs, equipment images with real-time display of LED indicators, error statistics, etc., under OpenView running on Windows or Unix-based platforms. Having this information does not mean you're managing the network, however.



IP Statistics for <CCC WANs>

IpInReceives	8068028	24
IpInHdrErrors	105	0
IpInAddrErrors	0	0
IpForwDatagrams	5986772	14
IpInUnknownProtos	0	0
IpInDiscards	0	0
IpInDelivers	1654435	9
IpOutRequests	1805811	11
IpOutDiscards	97561	0
IpOutNoRoutes	57611	0
IpReasmTimeout	0	0
IpReasmReqds	0	0
IpReasmOKs	0	0
IpReasmFails	0	0
IpFragOKs	0	0
IpFragFails	0	0
IpFragCreates	0	0

Figure 9

More advanced management should provide real-time network maps, network inventory, network usage and percent utilization, and a whole set of Sniffer-like capabilities like session capture, seven-layer protocol decode, WAN datascope, and end-to-end network testing that dramatically improve the ability to manage and maintain remote office networks.

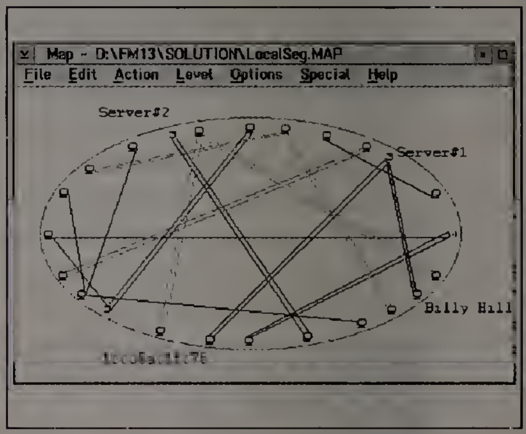


Figure 10

Future capabilities are likely to include expert system-based diagnostic capabilities targeted at further reducing the cost of network support and increasing network uptime.

Virtual On-site Technology (VOT)

Breakthrough Network Management for Remote Office Networks

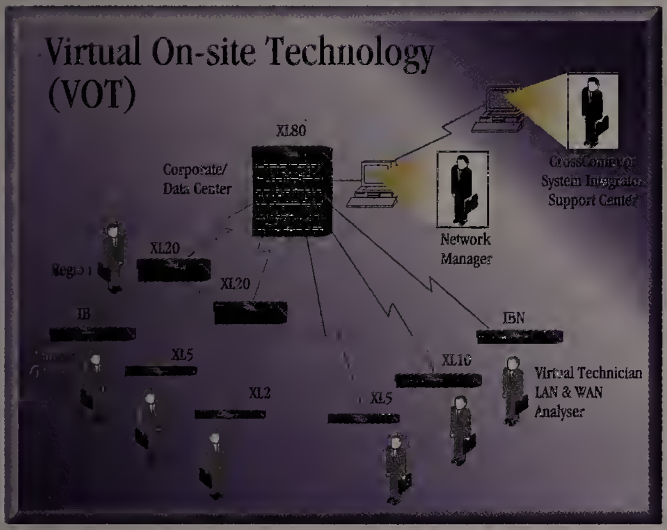


Figure 11

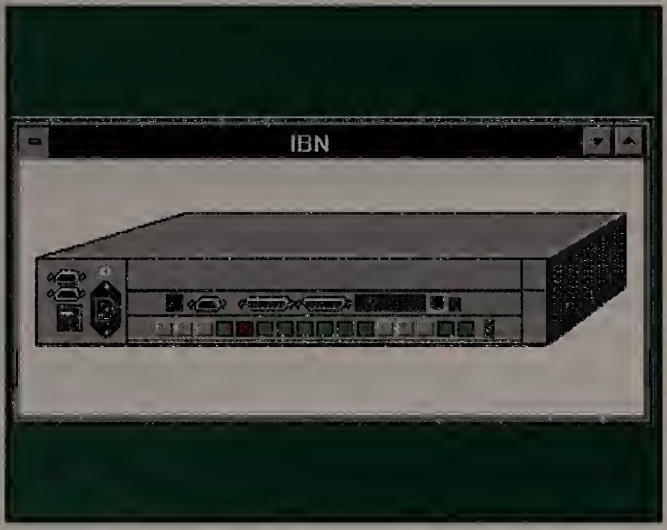


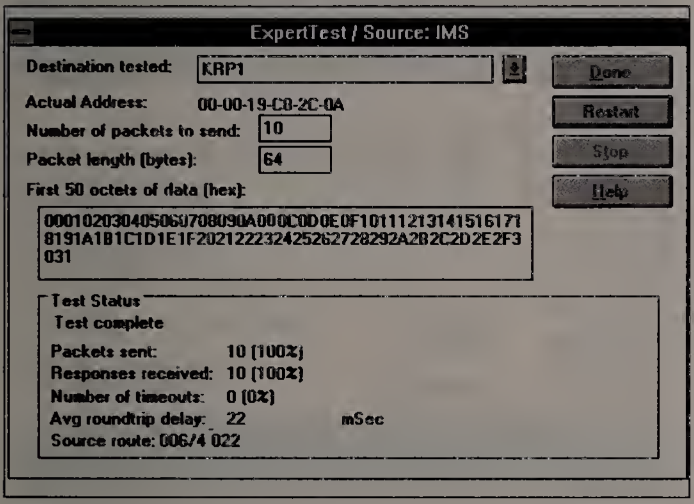
Figure 12

CrossComm's Virtual On-site Technology (VOT) provides SNMP- and RMON-based network management capability that dramatically reduces the cost of managing and maintaining remote office networks. Rather than sending network technicians loaded with LAN analyzers and datascopes all over the country to maintain your network, CrossComm builds the test equipment functionality into its remote office routers.

By taking advantage of the strategic locations of routers in a network, VOT lets your technicians stay at the central data center and remotely collect information, test, and diagnose your network down to the individual LAN device. It is like having a highly qualified network engineer equipped with all the test gear located at each remote office instantaneously. Click on the icon and you are there. If your technicians are stuck, CrossComm's (or your outsourcing agent's) staff can dial into your network and diagnose the problems just as if they were physically at your data center or any one of the remote offices. (See Figure 11 for a graphical display of VOT technology at work.)

REMOTE DIAGNOSTICS

Remote Office Status: A quick glance at the real-time LED display shows the basic equipment



Destination tested: KRP1

Actual Address: 00-00-19-C8-2C-0A

Number of packets to send: 10

Packet length (bytes): 64

First 50 octets of data (hex):

```
000102030405060708090A000C0D0E0F101112131415161718191A1B1C1D1E1F202122232425262728292A2B2C2D2E2F3
031
```

Test Status

Test complete

Packets sent: 10 (100%)

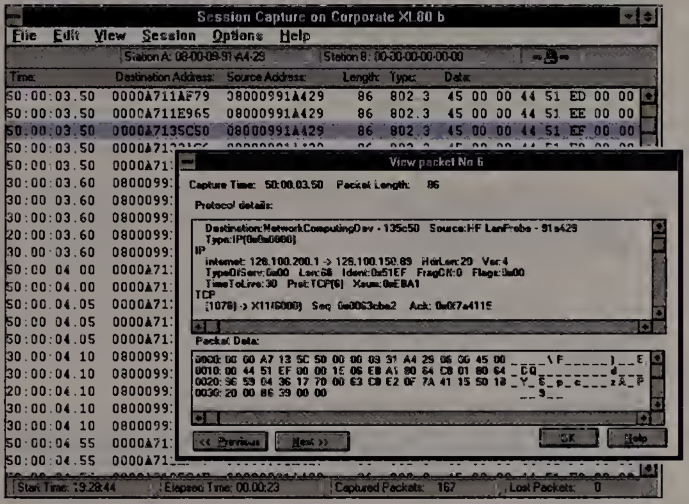
Responses received: 10 (100%)

Number of timeouts: 0 (0%)

Avg roundtrip delay: 22 mSec

Source route: 006/4 022

Figure 13


Session Capture on Corporate XL80 b
File Edit View Session Options Help
View packet No 6
<< Previous
Next >>
OK
Help

```
Station A: 08-00-09-91-A4-29      Station B: 00-00-00-00-00-00
Time:        Destination Address:  Source Address:  Length:  Type:  Data:
50:00:03.50  0000A711AF79  08000991A429  86  802.3  45 00 00 44 51 ED 00 00
50:00:03.50  0000A711E965  08000991A429  86  802.3  45 00 00 44 51 EE 00 00
50:00:03.50  0000A7135C50  08000991A429  86  802.3  45 00 00 44 51 EF 00 00
50:00:03.50  0000A71
50:00:03.50  0000A71
30:00:03.60  0800099
30:00 03.60  0800099
30:00:03.60  0800099
20:00:03.60  0800099
30.00:03.60  0800099
50:00 04 00  0000A71
50:00:04.00  0000A71
50:00.04.05  0000A71
50:00 04.05  0000A71
50:00:04.05  0000A71
30.00:04 10  0800099
30:00:04.10  0800099
20:00:04.10  0800099
30:00.04.10  0800099
30:00:04 10  0800099
50:00:04 55  0000A71
50:00:04.55  0000A71
Start Time: 19:28:44   Elapsed Time: 00:00:23   Captured Packets: 167   Lost Packets: 0
```

```
Capture Time: 50:00.03.50   Packet Length: 86
Protocol details:
  Destination:NetworkComputingDev - 135c50   Source:HP LanProbe - 91a429
  Type:IP(0x0800)
IP
  internet: 128.100.200.1 -> 128.100.150.89   HdrLen:20   Ver:4
  TypeOfServ:0x00   Len:68   Ident:0x51EF   FragOff:0   Flags:0x00
  TimeToLive:30   Prot:TCP(6)   Xsum:0xEBA1
TCP
  (1079) -> X11(6000)   Seq 0x0063cba2   Ack: 0x0f7a4115
Packet Data:
0000: 00 00 A7 13 5C 50 08 00 09 91 A4 29 06 00 45 00
0010: 00 44 51 EF 00 00 1E 06 EB A1 80 64 C8 01 80 64
0020: 96 59 04 36 17 70 00 63 CB E2 0F 7A 41 15 50 18
0030: 20 00 86 39 00 00
```

Figure 14

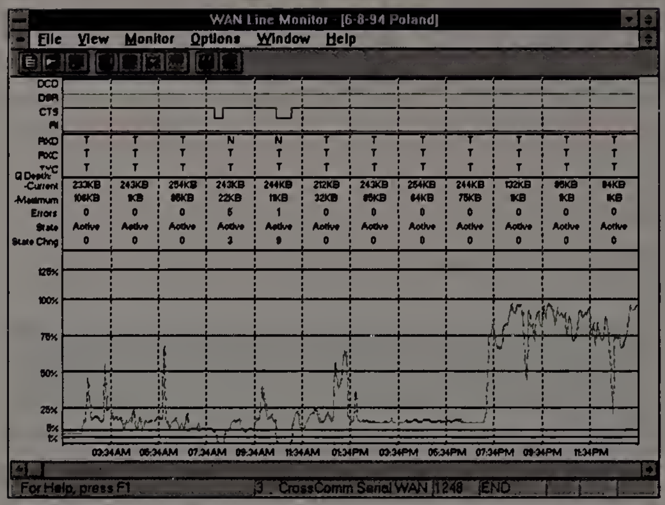
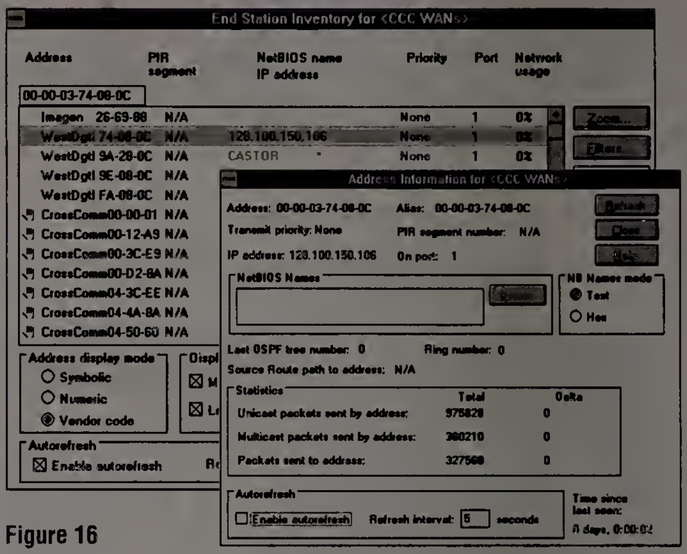

WAN Line Monitor - [6-8-94 Poland]
File View Monitor Options Window Help
DCD
DSR
CTS
RI
RXD
RXC
TXC
Q Depth: -Current
-Maximum
Errors
State
State Chng
125%
100%
75%
50%
25%
5%
1%
03:34AM 05:34AM 07:34AM 09:34AM 11:34AM 01:34PM 03:34PM 05:34PM 07:34PM 09:34PM 11:34PM
For Help, press F1
3 . CrossComm Serial WAN 1248 END

Figure 15


End Station Inventory for <CCC WANs>

00-00-03-74-08-0C

Address	PIR segment	NetBIOS name IP address	Priority	Port	Network usage
Imagen 26-69-88	N/A		None	1	0%
WestDgtl 74-08-0C	N/A	128.100.150.106	None	1	0%
WestDgtl 9A-28-0C	N/A	CASTOR	None	1	0%
WestDgtl 9E-08-0C	N/A				
WestDgtl FA-08-0C	N/A				
CrossComm00-00-01	N/A				
CrossComm00-12-A9	N/A				
CrossComm00-3C-E9	N/A				
CrossComm00-D2-8A	N/A				
CrossComm04-3C-EE	N/A				
CrossComm04-4A-8A	N/A				
CrossComm04-50-60	N/A				

Address display mode
○ Symbolic
○ Numeric
● Vendor code

Autorefresh
☒ Enable autorefresh

Address Information for <CCC WANs>

Address: 00-00-03-74-08-0C
Alias: 00-00-03-74-08-0C
Transmit priority: None
PIR segment number: N/A
IP address: 128.100.150.106
On port: 1

NetBIOS Names

NB Names mode
● Text
○ Hex

Last OSPF tree number: 0
Ring number: 0
Source Route path to address: N/A

Statistics

	Total	Delta
Unicast packets sent by address:	975828	0
Multicast packets sent by address:	360210	0
Packets sent to address:	327568	0

Autorefresh
☐ Enable autorefresh
Refresh interval: 5 seconds

Time since last seen: 0 days, 0:00:02

Figure 16

and connectivity status (see Figure 12). You can verify the connectivity status of each remote office without going On-site.

Connectivity Test: Tests the quality and delay of the communication path between a PC at one office and a file server at the other (see Figure 13). The first step in remote problem diagnostics is the connectivity test which allows you to test the quality of each network connection.

Session Capture: Captures the actual data packets sent between any two computers at any location in a network and displays them at the data center. A powerful protocol decoder helps analyze network or application layer problems at remote sites (see Figure 14). Sniffer™-like packet capture provides advanced diagnostics for every remote office in the network without the expense of test equipment and technical personnel at every site.

WAN Line Monitor: Tests line quality and monitors modem signals for any WAN line in the system. It's like having an oscilloscope connected to each WAN link and monitoring every signal (see Figure 15). WAN line diagnostics are quick and easy. Up to eight hours of vital WAN signals and statistics are stored in every router so that even intermittent problems can be analyzed and solved.

ADMINISTRATION

Network Inventory: Click on any port of any router and get a display of which computers are connected to the remote LAN. Zoom in on any device to find its network history (see Figure 16). Keep track of who is connected to which remote network by a simple point and click.

Network Usage: Display real-time information of who is using the remote LAN and how (see Figure 17). Analyze traffic patterns to proactively add capacity or re-design network topology.

WAN Utilization: Get data on the percent utilization of your WAN links and graph trends to help in capacity planning (see Figure 18). Find out when your network will run out of bandwidth by tracking WAN usage trends.

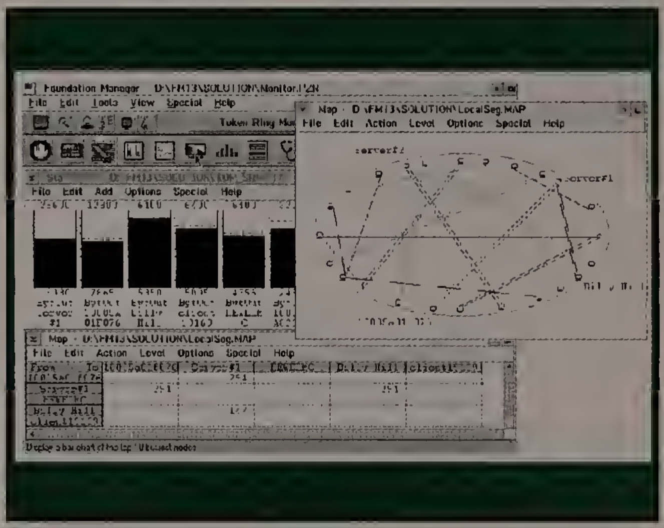
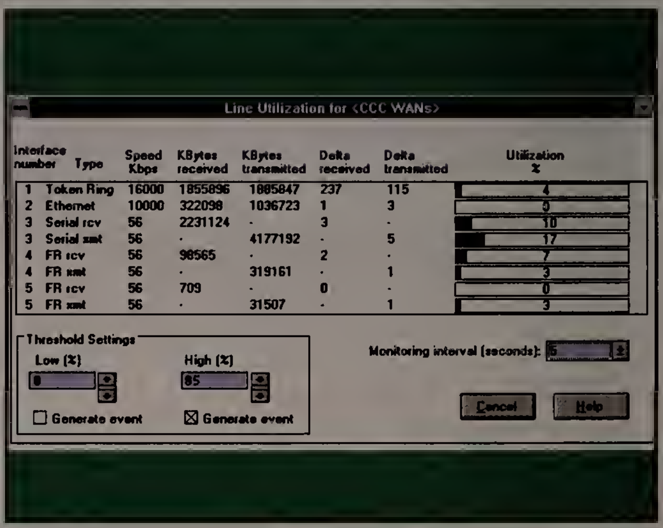

Foundation Manager
Map
File Edit Tools View Special Help
File Edit Action Level Options Special Help

Figure 17


Line Utilization for <CCC WANs>

Interface number	Type	Speed Kbps	KBytes received	KBytes transmitted	Delta received	Delta transmitted	Utilization %
1	Token Ring	16000	1855896	1885847	237	115	4
2	Ethernet	10000	322098	1036723	1	3	0
3	Serial rcv	56	2231124	-	3	-	10
3	Serial xmt	56	-	4177192	-	5	17
4	FR rcv	56	98565	-	2	-	7
4	FR xmt	56	-	319161	-	1	3
5	FR rcv	56	709	-	0	-	0
5	FR xmt	56	-	31507	-	1	3

Threshold Settings
Low (%): 0
☐ Generate event
High (%): 85
☒ Generate event

Monitoring interval (seconds): 5

Figure 18

CrossComm Network Solutions

CrossComm is the innovator in the pragmatic use of communications technology to meet mission-critical network requirements.

Backbone

XL80: Award-winning, high-performance, fail-safe router designed to route LAN packets using a parallel router architecture. Up to eight four-port router modules, each driven by four Intel i960 RISC processors and custom-designed Address Processor and Directory performing up to one million routing decisions per second, hot-swap without rebooting, redundant power supplies, internal hub, compression, and CSU/DSU options.

Regional

XL20: Based on the XL80 award-winning architecture, the XL20 is the first and only mid-range router with no single point of failure. Up to four four-port router modules, internal compression, and CSU/DSU.

Remote

XL10: Modular router entry point with one LAN and three WAN ports. Optional integral hub, RMON, SDLC-LLC conversion for SNA traffic, compression, and CSU/DSU, covered by a single management system. The XL10 offers optional dial backup.

IBN: Efficiently integrated remote router and hub with optional RMON probe, SDLC-LLC conversion, compression, and CSU/DSU. Industry touted for integrating up to six functions, covered by a single management system. The IBN offers one LAN and two WAN ports, and has optional dial backup.

XL5: Cost-efficient router that offers one LAN and two WAN ports. It also integrates up to five functions with optional RMON, SDLC-LLC conversion, compression, and CSU/DSU covered by a single management system. The XL5 offers optional dial backup.

XL2: Cost-efficient router with one LAN and one WAN port. It integrates up to four functions with optional RMON, compression, and CSU/DSU, is covered by a single management system, and has optional dial backup.

Routing Software

MULTI-PROTOCOL ROUTER SOFTWARE: Standards-based, high-performance routing and bridging software optimized for critical traffic delivery, routes a wide range of protocols including IPX, OSPF, RIP, XNS, AppleTalk, DECNet, etc; and other capabilities including three-second dynamic routing of SNA and NetBIOS, SDLC pass-through, NetBIOS broadcast resolution, parallel line support, SRT bridging, Frame Relay, HDLC, and X.25.

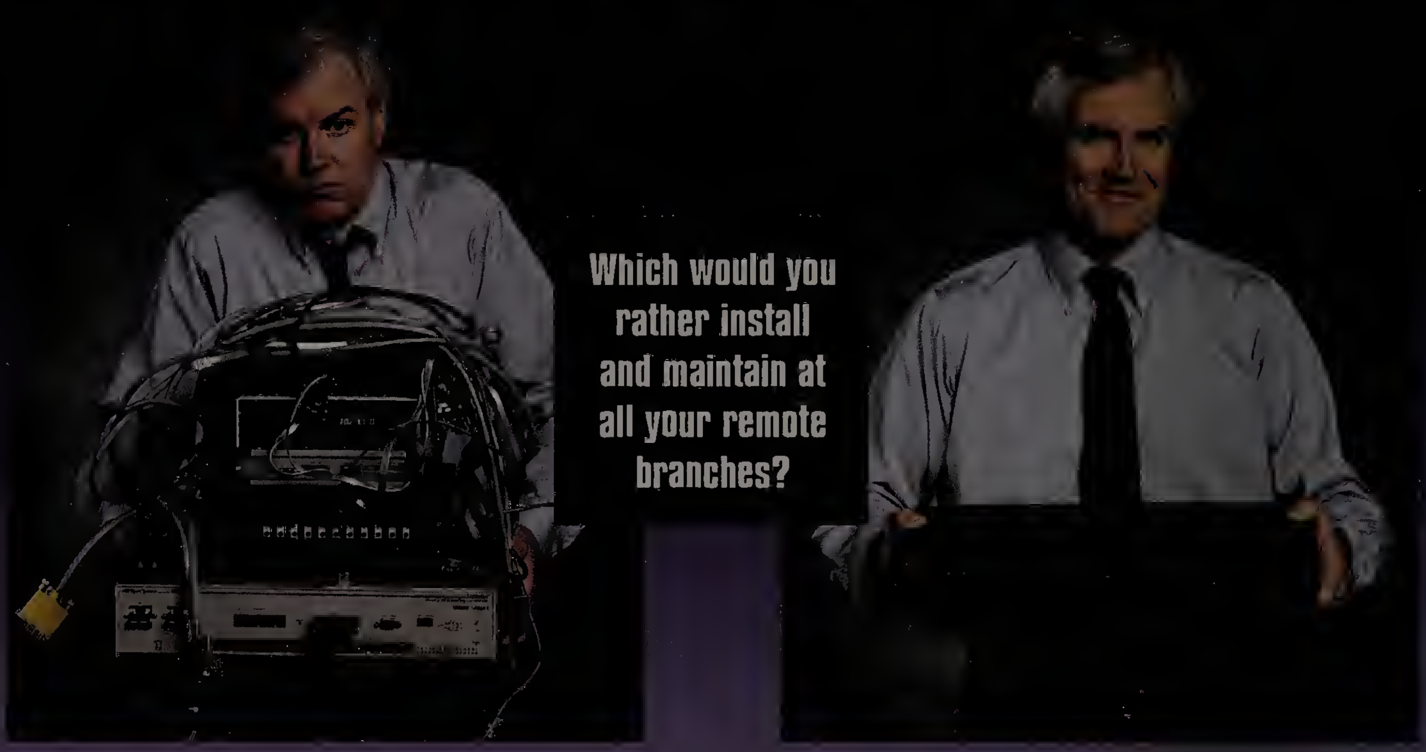
Virtual On-site Technology(VOT)

VOT LEVEL 1: Includes new advanced versions of CrossComm's HP Open View-based Internetwork Management Software (IMS) for end-users. IMS adheres to the SNMP (Simple Network Management Protocol) industry standard and can manage an entire network from a single workstation.

VOT LEVEL 2: Includes Level 1 plus unique troubleshooting services provided by CrossComm's Network Services Group for pinpointing sources of network problems regardless of the responsible equipment.

VOT LEVEL 3: Includes Level 1 and 2 *plus* ExpertHelper, a new client/server help desk and call tracking application. ExpertHelper uses workflow-based electronic mail services to instantly alert, escalate, and route network alarms to CrossComm's Network Services Group.

No Brainer.



Which would you rather install and maintain at all your remote branches?

Branch Office Networking Their Way.

- 6 different units from different vendors:
  - Router
  - Hub
  - Compression
  - SNA to LAN Converter
  - RMON Probe
  - CSU/DSU
- More complex to install.
- Separate management for each box.
- High maintenance costs.
- Many cable failure points.
- Unknown box compatibility.
- Repeated at every branch office you connect!

Branch Office Networking Our Way.

- CrossComm's Integrated Branch Node, 6 functions in 1 unit.
- With breakthrough remote management technology that cuts support costs.

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GLOBAL SERVICES

Voice, Data and Wireless Services, Regulatory Issues and Voice CPE

AirTouch, US WEST cellular operations join forces

BY BILL BURCH

Washington, D.C.

US WEST, Inc. and AirTouch Communications last week announced plans to merge their domestic cellular operations into two joint venture companies — one to run the combined cellular operations and a second to bid on broadband PCS licenses.

The combined cellular properties will make the partnership a strong cellular provider in the West, and the two firms said they intend to add coverage in the East through acquisitions, alliances and personal communications services auctions.

"We are destined to be one of the key players in wireless communications," said AirTouch Chairman Sam Ginn.

AirTouch was spun off from Pacific Telesis Group April 1, with the intention of creating a wireless company that could operate free of Consent Decree restrictions.

Together, the two companies have 1.7 million subscribers, placing the joint venture among the top five cellular companies, with licenses in 16 of the top 30 markets. AirTouch will own 70% of the joint cellular venture, which brings to the partnership its California coverage and operations in key metropolitan areas outside the state.

US West will get the remaining 30% stake, bringing the partnership wide geographical coverage but fewer of the lucrative urban areas cellular carriers covet.

The joint venture formed to bid on PCS licenses will be split fifty-fifty between the two companies.

Users and analysts liked the idea of nationwide cellular coverage. "For the corporate account, if they can find a carrier that can provide them coverage throughout the country, they've got one carrier to go to in terms of billing. It reduces finger-pointing if they have problems, and they can get uniform service," said Ira Brodsky, a consultant with Datacomm Research in Wilmette, Ill.

User Gerhard Blendstrup, an executive with ADP Claims Solutions Group in San Ramon, Calif., agreed. "If something goes wrong, I want one person to talk to," he said. "That's one of the advantages of the ARDIS [Co.] or RAM [Mobile Data] network — you only have one person to talk to. Also, you only have to do one contract nationwide."

For Phil Evans, director of telecommunications planning at Perot Systems, Inc. in Dallas,

See Cellular, *page 22*

AirTouch, US WEST partnership strong in the West

Joint venture will have cellular licenses in: Arizona, California, Colorado, Georgia, Idaho, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Mexico, North Dakota, Ohio, Oregon, Texas, Utah, Washington and Wyoming.

GRAPHIC BY SUSAN J. CHAMPENEY

1993 cellular profiles:

	AirTouch	US WEST
Net operating revenues	$890M	$375M
Subscribers	1.046M	509,000

AirTouch and US WEST are combining domestic cellular properties in a joint venture, to be owned 70% by AirTouch and 30% by US WEST, that will be among the five largest cellular carriers in the U.S.

BRIEFS

The **California Public Utilities Commission (PUC)** is edging closer to throwing the state's **Intra-LATA toll** market open to competition on Jan. 1. A total of 93 long-distance carriers are poised to enter the market. To prepare for competition, the PUC has proposed allowing GTE California and Pacific Bell to cut their local toll rates by 40% while increasing rates for other local services. The commission said it expects to make a final decision sometime in September.

Sprint Corp. said it has entered into a joint venture with a **Mexican wireless carrier** to build a voice and data net rivaling that of Telefonos de Mexico. The deal with Grupo Iusacell, S.A. de C.V. is geared toward the scheduled opening up of the Mexican long-distance market to competition in 1997.

At the request of the California PUC, the **Federal Communications Commission** has extended to Aug. 17 the deadline for comments on petitions for reconsideration of the FCC's **caller identification policy.** Regulators in California and other states have deluged the FCC with pleas to overturn its decision to preempt state authority to ban caller ID or automatic number identification services (*NW*, May 23, page 1).

It does not look like the private branch exchange is dead yet. The **world market for PBXs,** key systems and related equipment will grow from **$9.3 billion** in 1993 to **$16.9 billion** by the year 2000, said market researcher Frost & Sullivan, Inc. in Mountain View, Calif. Wireless office equipment will grow from virtually nothing in 1993 to nearly 20% of this market by the year 2000, the company predicted.

Eunetcom has signed up its third major customer, winning a contract to take over operation of the global private network backbone for France's **Groupe Bull.** Eunetcom came on-line in July and currently has hubs in Belgium, France, Germany, Italy, the Netherlands, Spain, the U.K. and the U.S. The alliance's plans call for migrating its network to Asynchronous Transfer Mode next year.

Sprint Corp. said it has won a contract to provide managed data network services in Europe for **Honeywell, Inc.** and will expand the European managed data network it provides for **Unilever plc.** The Honeywell network will use frame relay to link offices in Belgium, Germany and the Netherlands with one another and with the company's European Center in Newhouse, Scotland. The Unilever deal includes X.25 and frame relay services for all Unilever offices in 18 European countries.

ACD/server integration helps users out with fax-on-demand services

BY DAVID ROHDE

Santa Clara, Calif.

A software developer and a maker of automatic call distributors (ACD) have solved one of the big problems users face with fax-on-demand services: making the customer call different numbers for facsimile information vs. live help.

Ibex Technologies, Inc. in Placerville, Calif., has tied its FactsLine fax-on-demand system to ACDs manufactured by Aspect Telecommunications, Inc. in San Jose, Calif.

Key to the process is the fact that the Aspect ACDs — known as Aspect CallCenters — include a peer-to-peer communications link, or application bridge, to Novell, Inc. file servers, Lotus Development Corp. Notes databases and other data sources.

Following a successful beta test, the connection is due to be installed at Adobe Systems, Inc. here in order to make its Ibex fax-on-demand service available to customers who call its regular help lines, according to Adobe programmer/analyst Rick De-Block.

Adobe, a graphic arts company, stores 650 documents — including product specifications, font samples and software upgrade bulletins — on the Novell server supporting its Ibex system. Previously, customers had to call a separate telephone number, then key in their fax number and a document reference number, which was pulled from an Adobe fax-on-demand catalog they had to have on hand.

Now the customer will be able to call the regular help or sales desk telephone number and select documents offered via voice prompts. Both the fax and document numbers are transferred to the Ibex server, which processes the order and sends out the fax.

But the caller remains in the caller queue to talk to a help or sales desk agent.

"If we transferred them into Ibex, we'd cause them to lose their queue," DeBlock said. "Our customers don't want to leave the queue to request things."

The new method also enhances sales efforts by allowing the hold greeting to tout software upgrades.

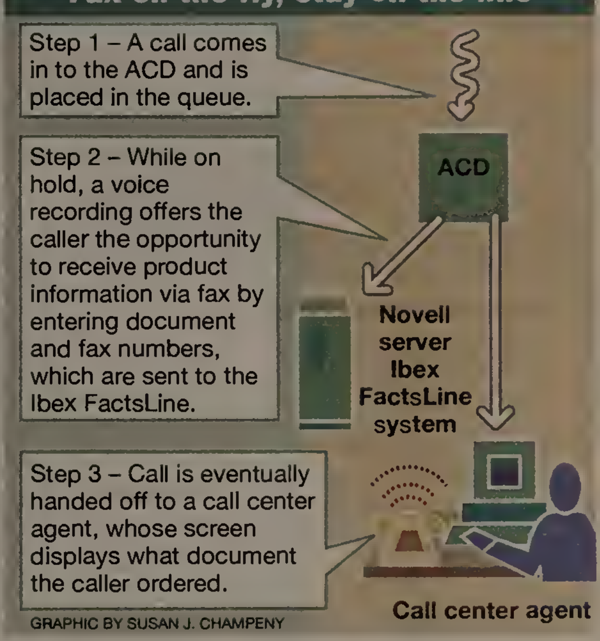
One weakness to the setup, DeBlock said, is that a caller to the live help line who happens to know all of the document numbers can only request those that are prompted by the hold greeting. But agents have the option to transfer the caller into the Ibex system, which lets them order any document.

DeBlock said he hopes for further enhancements that will allow Adobe help desk agents to deliver custom documents to customers, such as to detail a sales proposal.

Unlike other makers of so-called stand-alone ACDs — those not sold by private branch exchange manufacturers such as AT&T and Rolm — Aspect has been increasing shipments at a rapid clip.

The company recently reported a 52% increase in revenue and a 96% increase in profits for the second quarter compared to the same quarter last year. ⊡

Fax on the fly, stay on the line



Step 1 – A call comes in to the ACD and is placed in the queue.

Step 2 – While on hold, a voice recording offers the caller the opportunity to receive product information via fax by entering document and fax numbers, which are sent to the Ibex FactsLine.

Step 3 – Call is eventually handed off to a call center agent, whose screen displays what document the caller ordered.

GRAPHIC BY SUSAN J. CHAMPENEY

Cable companies looking at wireless to boost service image

BY JOANIE WEXLER

With the goal of making their field service operations more efficient and responsive, a number of user companies are set to test a wireless server from Racotek, Inc. that allows applications to work unchanged with multiple wireless net services.

Companies in businesses ranging from trucking and towing to cable television and appliance stores are looking to beef up operations and customer service by empowering technicians with sophisticated mobile data networking capabilities.

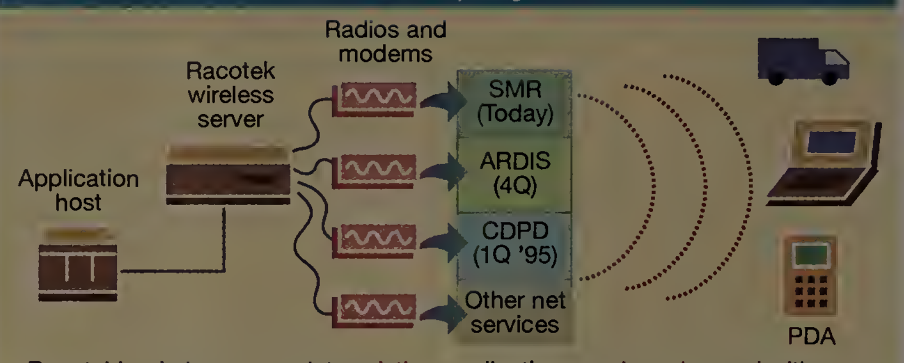
Two-way mobile data networks let workers in the field supply personnel back at the office with real-time information as to where they are, whether they are running late and need a replacement dispatched to the next job, what parts must be ordered and other information that reduces the length of time it takes to meet customer demands.

Racotek's server enables such communication by letting users employ existing applications with a range of wireless services, including specialized mobile radio (SMR), and soon, the ARDIS Co. packet radio net Cellular Digital Packet Data (CDPD) and circuit-switched cellular technologies.

One motivation CATV companies have to bestow new wireless capabilities on field service workers is to compete in the customer service-driven phone business, said Matt Haviland, director of engineering at Paragon Cable in Minneapolis, a trial participant. "I envision eventually transitioning our work force to doing sales in addition to installation," he said. "I think a hand-held plus a salesperson gives us the ability to sell services and do upgrades on the spot."

Paragon is launching an application from Arrowsmith Technologies, Inc. in Austin, Texas, to automate its installation and service process. The application does not have a wireless interface to the E.F. Johnson SMR net that Paragon uses to communicate with workers in vehicles, Haviland said.

Pick a net, any net



Racotek's wireless server lets existing applications work unchanged with a mix of wireless services, accommodating those users that need multiple wireless infrastructures due to factors such as inconsistent coverage across sites.

GRAPHIC BY TERRI MITCHELL

The company is considering Racotek's server to forge the link to the Johnson SMR net. Haviland said the ARDIS net will soon be added to the mix to serve technicians with hand-helds in high-rise buildings who need to communicate in real time. Racotek expects to have the ARDIS interface available in the first quarter of next year.

While SMR is Paragon's low-cost, in-vehicle communication system of choice, it does not penetrate buildings as ARDIS does, rendering an out-of-truck technician virtually incommunicado in the data world. About a third of Paragon's 165,000 customers are in apartment buildings.

The Paragon-Racotek 90-day pilot would start with 10 trucks in September, and the firm would decide at year end whether to go live with all 70 Paragon trucks.

The ability of the Racotek server to work with different wireless services gives users the flexibility to use alternate providers to fill in primary carrier coverage gaps or take advantage of a better pricing scheme for a particular application, said Lowell Peters, national manager of parts, technical support and systems at Sears, Roebuck and Co. in Hoffman Estates, Ill.

Sears has turned for the moment to the ARDIS net for empowering its appliance service technicians but has had some talks with Racotek because "it might be useful to go to CDPD to fill in coverage gaps and possibly for some cost reasons," he said.

CellSmart, a RacoNet server feature under development and due out in the first quarter of next year, automatically chooses between CDPD and circuit-switched cellular technologies, said Richard Cortese, Racotek president. When a user sends a message, the software will check what infrastructure is available, then determine which is the most cost-effective and efficient network for the traffic type at hand, he said.

The Yankee Group, a Boston consultancy, recently surveyed 100 large companies, 86% of which said they envisioned running wireless nets containing multiple protocols and services. The reason: "Packet radio nets such as ARDIS have certain strengths for some applications; cellular is appropriate for others," said Roberta Wiggins, director of mobile computing.

Cellular

Continued from page 21

the partnership's appeal lies in the prospect of seamless nationwide roaming.

Other companies may be positioned to offer the same benefits as the AirTouch-US WEST joint venture, which is the latest in a series of giant alliances reshaping the wireless industry. It follows the merger of Bell Atlantic Corp.'s and NYNEX Corp.'s cellular operations, AT&T's planned purchase of McCaw Cellular Communications, Inc. and MCI Communications Corp.'s acquisition of part of Nextel. All come as carriers angle for national coverage and line up partners in preparation for the broadband PCS auctions.

Once the deal is complete, the combined operations will have tremendous growth potential in a cellular market growing 45% to 55% annually.

Even though the alliances are creating wireless behemoths, larger companies are not necessarily a bad thing, Evans said. If AirTouch and US WEST teamed up with Bell Atlantic and NYNEX, that alliance would have nationwide coverage, he pointed out.

As for AT&T, its AT&T Bell Laboratories research arm could make valuable contributions to wireless research, Evans said. The AT&T-McCaw alliance also could cut users' bills by providing package deals with discount local access, Brodsky said.

MERGER SPECIFICS

For now, AirTouch and US WEST will continue to run their cellular operations as separate businesses, albeit under a single corporate umbrella, the Wireless Management Company, to be run by AirTouch President Lee Cox. The two companies chose to remain separate to avoid entangling AirTouch in the Consent Decree's long-distance restrictions that US West is forced to obey.

By going with a temporary management arrangement, the companies position themselves for the possible abolition of the Consent Decree. Failing Consent Decree relief, the two firms said they would merge their cellular operations after four years.

The deal is expected to close in the second quarter of next year if the companies receive antitrust approvals, get Federal Communications Commission permission for license transfers and obtain permission from state regulators. To win those approvals, the two companies will need to shed some operations in markets where the combined companies hold both cellular licenses. For example, the companies hope to trade one of their two licenses in San Diego to another cellular carrier.

Once the deal is complete, the combined operations will have tremendous growth potential in a cellular market growing 45% to 55% annually, according to US WEST Chairman Richard McCormick. Company executives valued their combined assets at $13.25 million, using a standard industry yardstick based on the number of people in their coverage area. Each of the 53 million people served is valued at $250, they said.

As for the PCS auction, McCormick said, "We're going to bid on PCS licenses to establish a nationwide footprint." US WEST will be able to draw on its experience bidding on PCS licenses in the U.K., where the carrier currently helps run the Mercury One-2-One PCS network.

The impact of the PCS auctions on carriers' cellular operations is still a ways off, however. Company executives estimated a four-year delay before PCS and cellular systems are integrated.

Late hand-helds may stall services based on agents

BY JOANIE WEXLER

It could be awhile before mobile business professionals count on personal communicators outfitted with intelligent software agents to run errands for them across networks.

The integration of the software, personal communicator hardware and net services necessary to let intelligent agents do their productivity-boosting job of filtering incoming communication, locating information and performing transactions has fallen behind schedule as vendors such as AT&T, Motorola, Inc. and General Magic, Inc. have discovered the effort to be more of a challenge than anticipated.

For example, Motorola's Envoy personal communicator, announced in March and slated to ship this summer for about $1,500, has now been rescheduled for a year-end launch, Motorola said.

The setback doesn't bode well for AT&T's PersonaLink Services, which rely on either the Envoy or a forthcoming personal communicator from Sony Electronics, Inc. as the user access device to an electronic community of databases, news reports, virtual shopping malls and other services.

PersonaLink was announced in January, along with the software from General Magic that drives the Motorola and Sony communicators, and was to be commercially available by summer's end.

PersonaLink spokeswoman Gail Silver maintained that AT&T has not given up on a late summer/early fall PersonaLink launch, saying the service is now in "robust test mode internally and with other members of the PersonaLink alliance."

Awaiting agents

There are 16 million business users who could benefit by agent-based technology today and another 16 million consumers who would be ready within two to three years, according to estimates by The Yankee Group in Boston.

However, Sony spokesman David Yaun described Silver's goal as "ambitious." He said Sony is hoping to make an announcement soon about whether its under-$1,000 communicator, originally scheduled to ship during the second half of this year, "is going to come out this year or next. There is still integration work to be done among AT&T, General Magic and Sony," he added.

The delays will hurt user plans less than they will vendor credibility. The reason: Users have no experience with these tools so they won't know what they're missing. "I can conceptualize applications for intelligent agents, such as helping my users with research," said Ted Boynton, manager of telecommunications at AT&T shop Praxair, Inc., an industrial chemicals maker in Danbury, Conn. "But we won't be in a bind if this comes out six or eight months late."

A key PersonaLink application is an electronic mall, called eShop, for which AT&T customers such as retailers can develop sophisticated applications for selling their wares on-line, including full-motion multimedia "stores" for users to browse.

"I doubt many firms are far along building applications for eShop," said Samuel May, mobile computing analyst at Yankee Group. "No one is expecting substantial dollars to come off eShop next year."

Silver, however, said AT&T has made major headway in signing up customers to buy virtual real estate in the mall, though she declined to name them.

RATE & TARIFF MONITOR

by Eric Paulak

Want long-distance stability? Think small

Wouldn't it be nice to know that your long-distance rates are guaranteed not to go up for the next couple of years?

If you use one of the Big Three long-distance carriers, it's not likely that you can get such a promise.

Smaller carriers and aggregators/resellers, on the other hand, offer good prices at guaranteed fixed rates for the term of your contract, although you may end up paying more elsewhere. Take a look.

If you signed a deal with AT&T last year to get a 30% discount off of its Megacom service, for example, you may be paying 30% less than what someone else is getting with standard tariffed Megacom service. But your rates still went up a total of 12.5% after the three increases AT&T imposed during the past 11 months.

LCI International — a $400 million company run by ex-MCI execs — on the other hand, is trying to gain market share, so it'll guarantee its rates for the term of your contract. In return, it asks only for a minimum commitment of $250 a month for one year.

And its recent acquisition of several undersea cable systems allows LCI to become an international "facilities-based" carrier, meaning it doesn't have to lease international circuits from another carrier. That should translate into lower international rates for you.

LDDS/Metromedia Communications Corp. will not only guarantee its rates won't go up, but if rates go down, the carrier will give you the better deal or let you out of your contract with no penalty. LDDS/Metromedia makes this offer at about $1,000 a month as long as you've received a competitive bid from another carrier.

Now the drawbacks: These carriers have fewer and more-widely dispersed switches and points of presence (POP), so it may be more expensive to reach them via mileage-sensitive access lines. LDDS/Metromedia, for example, only has 32 sites than can accept a T-1 access line, whereas AT&T has 522.

In addition, LDDS/Metromedia has been going through some growing pains as it merges the separate LDDS, Metromedia and Resurgens networks into one national network. Specifically, the Signaling System 7 software on the carrier's main Digital Switch Corp. switch in New York has crashed several times in the last 10 months, and since the company doesn't have extensive rerouting capability, traffic was interrupted all along the East Coast.

One way around the small carrier problems is to go to an AT&T aggregator/reseller. Advanced Communication Technologies in Minneapolis, for example, offers the same fixed low rates as smaller carriers.

One possible problem with aggregators and resellers is their reputation. A very small percentage of aggregators has given the whole industry a bad name because of unscrupulous practices and billing problems. The easiest way around this "problem" is to do what you should before doing business with anyone: Check their references.

If you can live with these drawbacks, however, you can get a great deal from an aggregator or second-tier carrier. For example, United Communications Group — CCMI's parent company — is getting a guaranteed daytime rate of eight cents a minute for inbound and outbound dedicated access traffic from LDDS/Metromedia, plus three months free service. In return, we have a monthly commitment of just $15,000 for the next three years.

United Communications Group isn't paying higher access rates either because we also happen to be near an LDDS/Metromedia POP.

If you're ruling out smaller carriers and aggregators due to their lack of size and reputation, remember this: MCI started out as an AT&T reseller with just a few of its own microwave towers. It's now the second largest carrier in the U.S. and the fourth largest in the world.

➡ Paulak is associate publisher for the Center for Communications Management Information (CCMI), a provider of rate and tariff information in Rockville, Md. He can be reached at (301) 816-8950, Ext. 327, or at ccmi@clark.net.

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Technology Update: Workgroup Computing

October 6, 1994 1-3 pm ET

Workgroup computing is an attractive concept to most organizations, yet there are challenges to effective implementation at many levels. The software products are new, integration standards are not well defined, and the products don't always work well with each other. This interactive satellite seminar will provide details on the standards being created to guarantee smoother integration of groupware technologies and show participants what to look for—and look *out* for—in platforms and software available today.

Using Multi-Media for Education and Business

January 26, 1995 1-3 pm ET

Multi-media has taken hold and is fast replacing static charts and diagrams in business and training. Instructors, trainers, and sales people can now produce exciting electronic presentations right on the desktop—if they have the right tools and understand how to use them. This interactive telecast will provide participants with a working knowledge of multi-media concepts and products and teach them how to assemble a multi-media presentation. Topics will include networking multi-media applications, analog-to-digital conversion, animation and graphics tools, personal computer video editing, compression, and mass storage devices.

Operating System Decisions

April 6, 1995 1-3 pm ET

In the past, information systems professionals needed to understand a single, machine-specific operating system—but not any more. Current trends point toward operating systems that can work with many different microprocessors—Windows NT, OS/2, UNIX, System 7.x, Alpha. This videoconference will examine the impact this shift can have on an organization and teach participants about the strengths and weaknesses of popular small-system operating systems, how various microprocessors and applications work with these systems, and how emerging technologies will affect small-system computing in the near future.

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CLIENT/SERVER APPLICATIONS

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WORKFLOW

Action works on its Notes-based product

BY ADAM GAFFIN

Alameda, Calif.

Action Technologies, Inc. next week will begin shipping an enhanced version of its workflow product for Lotus Development Corp.'s Notes that features built-in applications for getting users started, as well as a 75% reduced price.

ActionWorkflow Manager for Notes 1.5 features new client-based front-end software called Workbox that contains the new applications and serves as an electronic mailbox for storing workflow documents.

Applications included are an ad hoc workflow generator and a meeting planner, said Shirish Hardikar, director of marketing at Action Technologies. The software lets Notes users participate in workflow and document routing without requiring them to deal with Action Technologies' four-step workflow methodology

Taking Action

ActionWorkflow Manager for Notes 1.5 features:

- **Ad hoc workflow generator**
- **Workbox, an electronic mailbox for workflow documents**
- **Action Items application for prioritizing workflows**
- **To Do application for listing pending assignments**

An application dubbed Action Items lets users assign a priority to a given workflow document and track it as it flows through a department or enterprise. A To Do function gives users an overview of pending assignments.

Hardikar said Action Technologies has also tuned the underlying workflow engine, which resides on a Notes server, to speed the presentation of views, forms and screens to users.

In recent months, users have complained to Action Technologies that it was not worth the effort to deploy workflow across an enterprise, Hardikar said. Users described the technology, in general, as "not accessible, expensive, as well as complicated to develop and deploy," he said.

The new Notes version lets firms quickly roll out basic workflow procedures, like initiating and tracking a project, Hardikar said. Users can employ a separate Action Technologies tool, called ActionWorkflow Builder, to design more sophisticated applications.

Tom Koulopolos, president of Delphi Consulting, Inc. in Boston, said the new Action Technologies strategy of simplifying the workflow front end and filtering all of its documents through a single work space should appeal to users who may now have to deal with several interfaces for group work.

"End users have become schizophrenic because they're using three or four different tools to coordinate activity," he said.

The Action Technologies offering for Notes consists of both client and server software. Client software will be available on all Notes platforms, which includes Windows, Macintosh, OS/2 and Solaris 1.X. The server component runs on OS/2, with a Windows NT server to be released later this year after Lotus itself releases a Windows NT version of Notes.

Pricing starts at $1,999 for a 10-user license, down from $8,000.

©Action: (510) 521-6190.

DCA takes aim at Lotus Notes

BY ADAM GAFFIN

Alpharetta, Ga.

Lotus Development Corp. may get some tough new competition for its Notes groupware product when an unlikely suspect, Digital Communications Associates, Inc. (DCA), releases a new product called OpenMind in September.

DCA is best known for its Systems Network Architecture connectivity products, which include terminal emulation and gateway offerings.

OpenMind, a client/server-based application, will provide on-line conferences, document management and text retrieval functions, as well as programming hooks for integrating back-end data sources. Like Notes, it will rely on replication to distribute information across an enterprise, although OpenMind servers will only replicate changes to documents rather than copy entire documents as Notes does.

Other firms have tried to match pieces of Lotus' groupware application, but DCA is the first to compete with it across the board as an application platform, said John Dunkle, president of WorkGroup Technologies, Inc., a consulting firm in Nashua, N.H. OpenMind will actually have more "out-of-the-box" applications than Notes that require little or no programming, he said.

"It's workflow or document imaging for the rest of us," said Dunkle, referring to OpenMind's collection of ready-to-go applications.

PRODUCT PARTICULARS

The initial version of OpenMind will ship with a Windows NT server and Windows client. A Macintosh client is scheduled for October, while DCA said it is looking at server versions for Unix platforms and at a NetWare Loadable Module for Novell, Inc. NetWare networks.

Have an OpenMind

DCA, best known as an SNA connectivity product vendor will make its foray into the groupware market in September with OpenMind. The software will support group conferencing, document management and text retrieval functions, among others. It looks like a head-on challenger to Lotus Notes.

In OpenMind, clients handle the presentation of data, while servers act as messaging and document stores and routers.

The software supports several networking protocols, including Novell's Internetwork Packet Ex-change (IPX), Network Basic I/O System and Transmission Control Protocol/Internet Protocol.

OpenMind's group conferencing function arranges messages by subject so users can easily find information of interest to them.

When users enter a conference, they see a one-line summary of each message. The conferences also let users conduct full-text searches, not only through the messages, but also through documents attached to messages.

Document management functions in OpenMind include versioning and locking, which let users track changes and prevent others from making changes to a document while they are working on it.

OpenMind features viewers for some 150 different file types so recipients can look at

See DCA, *page 27*

Database users to take multidimensional view

Technology works with relational systems.

BY BARB COLE

Cambridge, Mass.

Companies that build large data warehouses are increasingly turning to multidimensional databases to analyze their business information.

Multidimensional databases describe data in many dimensions rather than in the traditional relational model of rows and tables. Not only can multidimensional databases provide users with faster answers to queries, but they can also cut down on the number of queries sent across a net.

So far, the market consists of products from small vendors. Offerings include Kenan Technologies' Acumate, IRI Software, Inc.'s Express, Arbor Software Corp.'s Essbase, Pilot Software, Inc.'s Lightship and Comshare, Inc.'s Commander Prism.

The major relational database vendors are expected to add multidimensional features, such as multidimensional data views, to their products, as well. However, they declined to comment on such plans for this story.

The distinction between relational and multidimensional databases is straightforward.

Relational database tables hold information, such as sales data, in separate fields. For example, the number of sales, color of items and model numbers could each be in separate fields. If a user wants to know how many items of a certain model and color were sold, three fields must be searched.

In a multidimensional database, that same sales, color and model information is stored in one array. Therefore, a user query would involve searching just that array.

As a result of its data structure, a multidimensional database can more efficiently provide information to users of decision support applications.

Most multidimensional databases include a client and server

See Databases, *page 26*

BRIEFS

Oracle Corp. last week said it is testing a beta version of **Oracle7 for Windows 3.1,** a multiuser database that can be shared by 15 people. It can work with Unix-based Oracle database servers via the firm's SQLNet middleware. The system is expected to be used for developing client/server applications that can be deployed on larger Oracle database servers. Oracle has had a void in this area since it discontinued the DOS version of its database, analysts said. According to Oracle, the software will require an Intel Corp. 486-based personal computer with 16M bytes of random-access memory and about 30M bytes of hard-disk space. The firm declined to say when the product will ship and how much it will cost.

Oracle: (415) 506-7000.

Square One of Woodbridge, N.J., has announced software to link Windows and Macintosh users with Digital Equipment Corp. **electronic mail** systems. The firm's Esperanto software provides a graphical interface to Digital's All-in-1 and VMS Mail systems, and lets users store, read and write messages on their desktop machines. It supports a variety of local net protocols and can be used over RAM Mobile Data's cellular net. Pricing starts at $150 per user.

Square One: (909) 602-9100.

Informix Software, Inc. by year end will incorporate components of **Information Builders, Inc.**'s Enterprise Data Access (EDA)/SQL database gateway technology into its own gateways. By embedding the technology into its gateways, Informix will let developers access IMS and VSAM data without having to write C programming code. Pricing information is not yet available.

Informix: (408) 926-6300.

Users, developers hoping for Oracle/Gupta merger

Deal could bolster Oracle's product offerings.

BY BARB COLE

Menlo Park, Calif.

A merger between Oracle Corp. and Gupta Corp. would give Oracle a powerful front-end development tool to round out its product line and provide Gupta with much-needed marketing muscle, according to users and independent software vendors.

Following the recent disclosure that Oracle had purchased 7.7% of Gupta's stock for about $10 million (and then reduced that share to 2.4% through a sell-off), users and analysts said a merger is likely. Oracle said it had entered into merger talks with Gupta, but both firms declined to comment further.

A merger would give Redwood Shores, Calif.-based Oracle an added edge over rival Sybase, Inc., which observers said also currently lacks a strong front-end development tool.

Oracle customers said Gupta's SQLWindows tool features a powerful programming language and is more flexible than Oracle Forms or Oracle Cooperative Development Environment (CDE).

In addition, SQLWindows is better suited for team development because it has built-in version control, they said.

"Bye-bye to SQLWindows? That's not very likely," said Dave Herndon, president of Southern Systems Consulting, a client/server application development firm in Charlotte, N.C., and Gupta customer. "Oracle may replace [Oracle] Forms with SQLWindows, but they wouldn't trash SQLWindows."

Graham Seibert, principal at Seibert and Costintino, a Bethesda, Md.-based Oracle consultancy, said, "A merger with Gupta would be a good move for Oracle, because Oracle is suffering somewhat in the acceptance of Forms."

SQLWindows is already well integrated with Oracle's database server, he added.

TAKING ON POWERBUILDER

Gupta users see a merger as a chance for the company's SQLWindows front-end development tool to gain the marketing resources it needs to take on Powersoft Corp.'s PowerBuilder tools. Oracle would be able to integrate SQLWindows with other vendors' computer-aided software engineering tools, which would ease large-scale development, observers said.

"This would be one hell of a blow to the Powersoft camp if Gupta's technology is merged into the Oracle product line," said Richard Taggs, president of Object Systems, a development firm in Washington, D.C.

Gupta's flagship SQLWindows has sold about 50,000 licenses compared to about 25,000 Powersoft licenses, according to Oracle. But since the release of the low-end PowerBuilder Desktop product in February, Powersoft has been gaining market share, thanks in large part to strong marketing.

UNCERTAIN FUTURE

The fate of SQLBase, Gupta's database server, is less certain. Oracle has two offerings — Oracle Workgroup Server and OracleWare — aimed at the same departmental audience where SQLBase plays.

While users are enthusiastic about the possible merger, analysts warned that joining the two companies may not be a good a fit.

"I don't think Gupta's products are necessarily a good fit with Oracle's current products," said Wayne Kernochan, director of commercial systems research at Aberdeen Group, Inc. based in Boston. "SQLWindows provides some of the functionality that Oracle CDE doesn't have, but making SQLWindows the premiere Oracle front end would leave a large installed base of [Oracle] Forms users without a clear migration path."

Merger musings

"I think they should merge. Oracle could use SQLBase to compete directly with Microsoft's SQL Server."

Richard Taggs,
President,
Object Systems

* * *

"It worries me because a merger may mean the dismantling of SQLBase and SQLWindows as we know them."

Richard Flynn,
MIS director,
Cooke Group of
Real Estate Services

Gupta adds SNMP support

The next version of Gupta Corp.'s SQLBase database will be manageable via Simple Network Management Protocol management systems, the company said recently.

SQLBase 6.0, due in September, will feature an SNMP-based version of Gupta's SQLConsole database administration tool.

The tool will run on management workstations alongside popular SNMP-based management systems, such as SunConnect's SunNet Manager and Hewlett-Packard Co.'s HP OpenView.

"Users will see [icons of] SQLBase servers from their SNMP systems, but will be able to click twice on them to drill down and access SQLConsole," said Craig Donato, product marketing manager for SQLBase at Gupta. "Once in SQLConsole, they'll be able to invoke its features, such as a stored procedures editor," he said.

Other systems management features include setting up data integrity rules, creating columns and changing user permissions.

Gupta: (415) 321-9500.

BY BARB COLE

CLIENT/SERVER

Software AG adds modeling, Windows development tools

BY KEVIN FOGARTY

Reston, Va.

Software AG of North America, Inc. last week began shipping a new application development modeling tool and a version of its Natural development tool for Microsoft Corp.'s Windows.

The Natural Engineering Workbench (NEW)/Define is designed to help corporate developers create models of their business processes, an important issue when building complex client/server applications.

And it is only, well, natural that Software AG would issue a Windows version of Natural, said Don DePalma, an analyst at market research firm Forrester Research, Inc. in Cambridge, Mass.

"Anybody who's not moving toward Windows is toast," DePalma said. "The question is how well it integrates with the model and how much code the model actually generates."

Having modeling and application development tools from the same company means that those tools will likely be more tightly integrated than products from different companies, according to Don Wolfe, vice president of computing and information systems at Brown University in Providence, R.I.

Software AG's modeling tool integrates well with Natural for Windows as well as with Natural applications for IBM hosts, said Wolfe, a longtime Software AG user. He is using the tools to migrate the university's applications for tracking student admissions and grades from an IBM mainframe to Hewlett-Packard Co. Unix servers.

"You can use tools from third parties and make them work," he said. "The question is, how much effort do you want to put into being a systems integrator?"

When Brown used KnowledgeWare, Inc. tools and third-party modeling software, Wolfe had to assign one or two of his 20 in-house programmers to make the models and tools work together with the applications the other programmers were developing.

Pricing for NEW/Define starts at $3,000 per user.

Natural for Windows comes in application development and run-time versions, both of which support Microsoft's Open Database Connectivity and come with a single-user version of Software AG's Adabas relational database for a repository. Pricing starts at $1,250 per user.

Natural applications run in Windows; IBM's OS/2, VMS/CMS, DOS/VSE and MVS; Digital Equipment Corp.'s OpenVMS; and various Unix versions.

©Software AG: (703) 860-5050.

Databases

Continued from page 25

component.

The client piece, used for browsing or querying the database, is typically a graphical user interface-based data access tool or application development tool such as Microsoft Corp.'s Visual Basic.

The server piece may run on the same machine as the relational database or on a separate server and acts as the database engine. Multidimensional database servers can also be linked to one another via the Open Software Foundation, Inc.'s Distributed Computing Environment or other connectivity technology.

Multidimensional databases typically integrate relational data through SQL links provided by the relational server vendors, like Oracle Corp.'s SQLNet and Sybase, Inc.'s Open Client. The relational data structures are then converted into multidimensional arrays. In addition, most multidimensional databases can import common personal computer data applications.

EFFICIENT DESIGN

Designing on-line analytical processing applications using multidimensional servers can actually be more efficient from a networking perspective than providing applications that require users to access relational data directly.

"We stage — or summarize — data in a multidimensional database so end users don't have to make all those relational queries," said Tom Rauh, vice president of Research and Planning, Inc., a Cambridge, Mass., developer of executive information systems for large corporations. Staging data means that firm can pull out batches of information frequent access to and locate it on a server local to those end users, he explained.

"This prevents an end user from doing a give-me-every-record-in-the-database request" and dragging that information across the network, according to Rauh.

Rauh uses Acumate ES, a multidimensional client/server system from Kenan Technologies.

Multidimensional databases will continue to gain popularity as companies seek to provide information to end users faster, according to analysts.

"Over time, they will revolutionize how people use information," said Bobby Cameron, senior analyst in the software strategies group at Forrester-Research, Inc. based in Cambridge. "Using a multidimensional database in order to analyze information is about eight times more efficient than using a relational database," he added.

Defining databases

Relational databases

- Best for on-line transaction processing applications.
- Store data in rows and columns.
- Have data that is constantly changed.

Multidimensional databases

- Best for on-line analytic processing applications.
- Store data in multidimensional structures with no size limit.
- Have data that is updated periodically (daily or weekly).

APPS DEVELOPMENT

SAS Institute and IBI add objects to tools

BY BARB COLE

Cary, N.C.

SAS Institute, Inc. here and Information Builders, Inc. (IBI) of New York have separately announced libraries of ready-made objects that can be used to build network applications with their respective development tools.

Browsing new object libraries

IBI's Level5 Object Professional
- Has OLE 2.0-compliant Windows objects.
- Lets developers build add-on objects.
- Allows objects to be built into new or existing applications.

SAS Institute's SAS/EIS objects
- Works with SAS/EIS.
- Runs on Windows, OS/2 and HP-UX.
- Is free to users of SAS/EIS.

Objects are reusable pieces of program code that execute particular functions. There is a growing trend among front-end tool suppliers to provide off-the-shelf objects to speed application development.

SAS Institute has made the following objects available for its SAS/Executive Information System (EIS) client/server-based executive information system: Comparison Report, Expanding Report, Multicolumn Report, Grouped Bar Chart, Organizational Chart and Multidimensional Data Viewer.

DRILLING FOR DATA

By incorporating these objects into applications, companies will make it easier for end users to drill down into information stored in SAS/EIS.

The objects, available now, can be used on applications running on Windows, OS/2 and Hewlett-Packard Co.'s HP-UX clients. In September, SAS will ship the objects on more than a dozen more Unix platforms.

IBI OBJECTS

IBI's Level5 Object Professional offering includes objects for incorporating video, audio, Open Database Connectivity, help systems and scheduling capabilities into applications via IBI's Level5 front-end development tool.

Level5 Object Professional also includes an object development kit that lets developers create custom objects.

It is available now for building and deploying applications on Windows desktops, and costs $2,995.

Analysts said object class libraries such as these speed development and are useful for developing user interfaces. But more is needed in the way of libraries that go beyond creating better graphical user interfaces, they said.

"We're still waiting for classes for specific applications, such as banking," said Paul Harmon, editor of "Object-Oriented Strategies," a newsletter in San Francisco.

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DCA

Continued from page 25

the document in its original form even if they do not have access to the software that created it. However, if they do have access to that software, they can then save the file for later manipulation.

The new DCA software is designed to integrate easily with other applications, such as electronic mail packages.

The software supports Microsoft Corp.'s Messaging Application Programming Interface and the Lotus-backed Vendor Independent Messaging API, a pair of E-mail application program interfaces.

One thing DCA will need to offer to sophisticated users is tools for rapidly prototyping and deploying applications, Coleman said.

The software also supports the automation feature of Microsoft's Object Linking and Embedding 2.0 for tying in external data sources. DCA is looking to support various APIs to access assorted document management and database systems.

Security is provided via hierarchical access control lists set by an administrator.

David Coleman, chairman of the semiannual Groupware conferences, said one thing DCA will need to offer in order to satisfy sophisticated users is tools for rapidly prototyping and deploying applications — one of Notes' most attractive features.

OpenMind pricing starts at $995 for one server and five clients. Additional client licenses start at $295 each.

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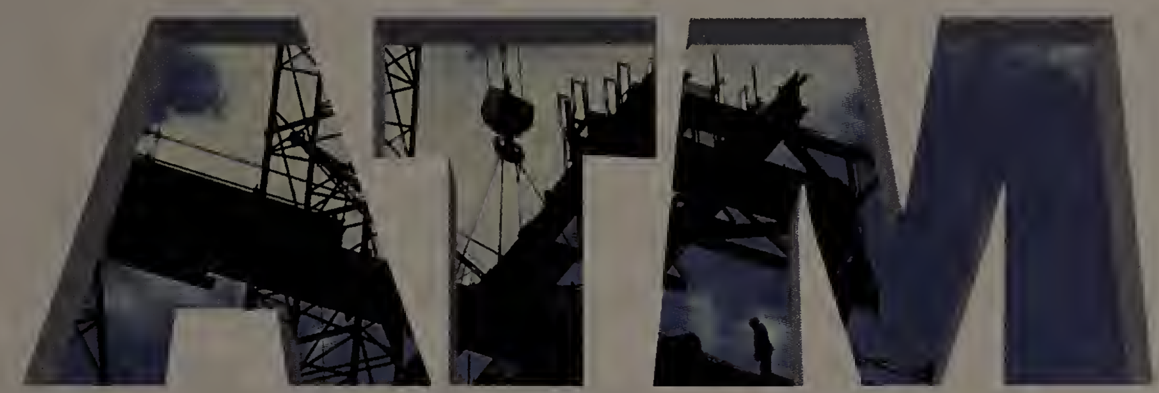

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The new AS/400 Advanced Series from IBM

EDITORIAL

Second chance

The recent revelation that availability windows will again be opening on a number of AT&T contract tariffs should have network managers licking their respective chops.

Contract tariffs are custom deals forged between a customer and AT&T that provide for discounts and fee waivers above generally tariffed term, volume and other discount plans. Once it files such a tariff for one user, AT&T is legally bound to offer the same deal to any other "similarly situated" customer.

The window of opportunity for securing such a deal is typically only 90 days after the original tariff is filed. However, a number of custom contracts with two- and three-year terms are now reaching their expiration dates. In order to re-sign the original customer, AT&T has to reopen the availability window not only to that customer, but to all others, giving everyone another stab at catching a sweet deal (*NW,* July 25, page 1).

This is opportunity knocking loud and clear.

Regrettably, not all users see it that way. Some say their business processes roll along according to a carefully orchestrated timetable, and they would take advantage of a reopened contract tariff only if it happened to coincide with their own schedule.

Others don't seem interested in the whole process. "Our business is not negotiation and deal cutting," one user says.

That must be just what AT&T wants to hear.

Users should jump all over this opportunity as it could mean real cost savings. It's these kinds of proactive moves that can help contribute to your organization's bottom line and dispel the all-too-frequently intoned notion that network IS professionals don't understand business requirements.

Larry Gessini, a former ICA president and director of telecommunications for Agway, Inc., has another practical reason for going after another user's contract tariff. "If the package that's out there fits your requirements, why reinvent the wheel?" he asks.

Why indeed?

A little work in finding a contract tariff that matches your requirements can save you from having to negotiate your own deal down the road. If you don't see your business as "negotiation and deal cutting," that's all the more reason to find a contract deal to your liking, as it means someone else went through that process for you.

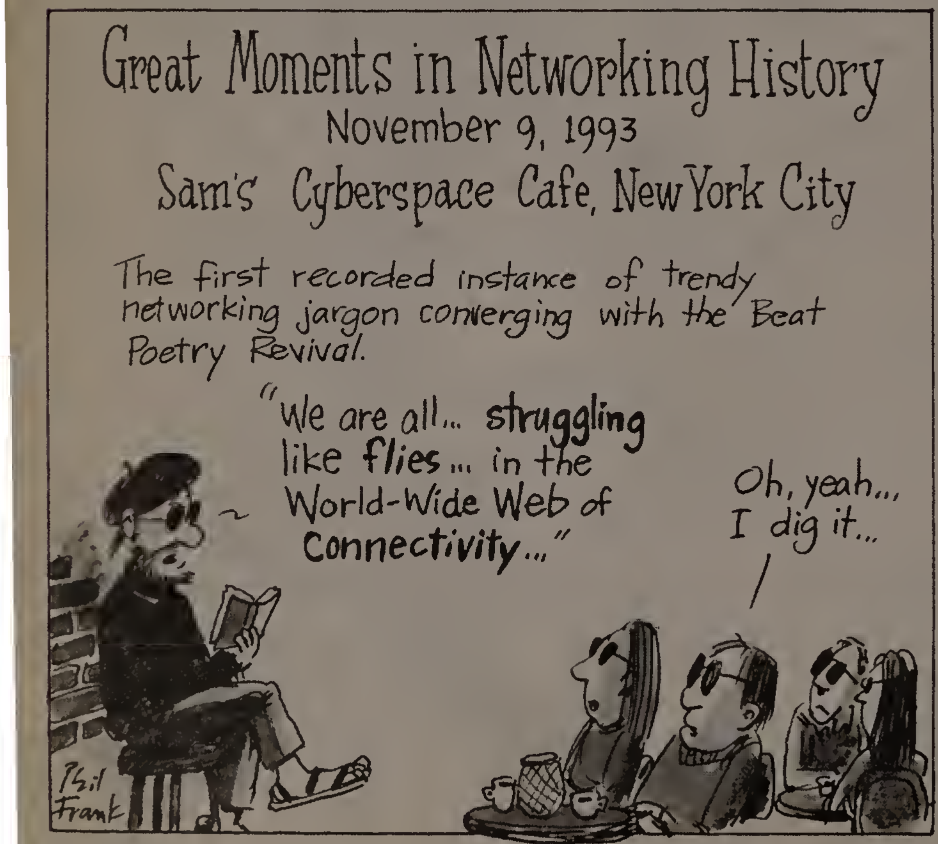
And even if you can't find a contract tariff that matches your situation exactly, elements of another user's deal can be used as leverage in forging your own custom contract.

Sure, it takes some work to find out when contract tariff windows are opening and what the terms of each contract are, but think about the payoff if you can cut even 1% or 2% off your AT&T bill.

➾**PAUL DESMOND** pdesmond@world.std.com

TELETOONS

FRANK AND TROISE


Great Moments in Networking History
November 9, 1993
Sam's Cyberspace Cafe, New York City
The first recorded instance of trendy networking jargon converging with the Beat Poetry Revival.
"We are all... struggling like flies... in the World-Wide Web of Connectivity..."
Oh, yeah... I dig it...
Phil Frank

REALITY CHECK

by Thomas Nolle

With its Nways line, IBM throws down the ATM gauntlet

In June, IBM put the ATM community to the test (*NW,* June 27, page 1). With a sweeping product rollout that offers something to address virtually every aspect of Asynchronous Transfer Mode provisioning, IBM's Nways line is certainly the most technically complete ATM solution yet provided.

But it isn't technical richness that makes Nways so important; it's affordability. Low price was IBM's ATM promise, the justification for rolling out a nonstandard 25M bit/sec desktop interface. They've delivered, and now the market will have to scramble to respond.

Many trade press articles have already outlined the makeup of Nways, but in summary, IBM announced a premises ATM strategy based on 25M bit/sec copper wiring and a switch strategy that combines frame and cell switching with switched virtual circuit support. The 25M bit/sec adapters cost less than $500, and a kind of ATM concentrator unit is used to combine multiple 25M bit/sec copper connections to create a 100M bit/sec fiber trunk. This trunk goes to the ATM-capable hub, where the real ATM switching takes place. This two-tier strategy keeps costs down to about $1,200 to $1,400 per desk.

ATM bigots are already crying foul, claiming that 25M bit/sec ATM isn't "real" ATM. What do they consider real — something you can read about but never hope to cost-justify, or something you can buy? What IBM did with its ATM pricing is prove that Big Blue was right in pressing for forum standardization of a lower access speed. Vendors who were too shortsighted to support the move should hunker down and face the music. Those who are complaining should either deliver 100M bit/sec ATM, or whatever they think "real" ATM is, at the same price, or quiet down and lose gracefully.

The reason for all of the vendor wrath here is clear: IBM's offering is going to impact every single aspect of the ATM market, from the big carrier switch vendors to end users. ATM will never be the same, and we're all going to have to come to terms with the differences.

For carriers and switch vendors, IBM's announcement means demand. At the pre-Nways price levels of about $5,000 per desktop, there was virtually no commercial demand for ATM. At $1,200 per port, there could be as many as 1.6 million desks wired with ATM by the end of 1996. That kind of native ATM-installed base creates the first real opportunities for ATM carrier service and ATM carrier switch sales the market has ever seen. Do you hate 25M bit/sec so much now, switch vendors and carriers?

Things may not be as rosy for the vendors closer to the desktop. Hub vendors are now faced with two choices: Meet IBM's low per-desk prices or tell users that ATM political correctness alone will justify a 400% cost excess. If you are a typical hard-working hub salesperson, it's pretty obvious which message you would rather take to your next prospect.

Hub problems may not stop there. Some hub vendors have adopted ATM strategies that are aimed at comforting users who fear their switching hub investment might be made obsolete by a future ATM requirement, rather than at creating a viable ATM-to-the-desk architecture. If such a vendor drops the price of ATM to match IBM's price, users may buy the stuff. What then? How many of these glittering ATM positions can stand up to real installation and use?

ATM hub vendors have another pressure to deal with: IBM's strategy for LAN emulation. IBM offers a LAN emulation server that reconciles addressing between users who have ATM and those who are still on traditional LANs. This function is implicit in all ATM hubs that provide LAN emulation, but IBM is the first to take it out of the hub and expose its details and functions to the world. In doing so, IBM is making it clear that networking these LAN emulation servers over wide-area services could create a flat network infrastructure that doesn't need routers.

That's the message behind IBM's so-called Transport Network Node product. According to IBM, these switches will be able to create protocol-independent backbone networks that can interconnect LANs, terminals, SNA mainframes, telephones, videoconferencing devices and more. The challenge this poses from IBM to router vendors is clear: Can you do, in a protocol-specific router sense, what we can do in an ATM sense? If not, routers may be the legacy device of the 1990s.

But perhaps Nways' strongest challenge is the one it presents to all those vendors who think they make up the ATM market. For these would-be ATM vendors, the last two years have been like a cocktail party. Nobody has really had to produce much, and everybody's gotten their picture in the paper. It's been great fun.

Now, all of a sudden, IBM is spoiling everything by delivering something users can buy. Now other vendors will have to deliver on all of those multimedia promises, demonstrate all those cooperative applications. Real issues will have to be faced — tough ones that will require work and sweat.

Or will they? IBM is still Goliath to just about anybody's David, the company we love to hate. Maybe we can just say that 25M bit/sec ATM is proprietary (never mind the fact that the marketplace refused to standardize it) or that IBM is too big to be trusted (never mind that all of the little guys dodged the issue of ATM pricing for years). There is still time to run and hide from the necessity of doing what we in the marketplace have been saying we're eager to do — buy ATM.

For users, the ATM market until now has seemed like a contest over which vendor could erect the largest billboard. IBM, by making ATM consumable on a large scale, invites the kinds of trials that will really validate (or disprove) all of the application theories that have been associated with ATM. But in order for IBM to do this, users will have to take on faith IBM's new and somewhat proprietary ATM directions. Hey, it's not like we haven't been asked to do this before.

That's what this is all about, in the final analysis. Is ATM important to business? Is there really a need for it? If there is, then the fact that IBM can make it affordable should be a challenge for competitors to do the same — or better.

➾Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or via MCI Mail at 349-5845.

USER FORUM

by Patty Pyles

Attend TCA and start planning for the future

Year after year, many user groups repeat the timeworn formula of holding supplier-sponsored conventions and periodic meetings to give professional peers an opportunity to network with one another. A few groups have taken the opportunity to assume a leadership role by reevaluating their programs, activities and mission. The future will belong to the user groups that choose a proactive focus.

The Tele-Communications Association, Inc. (TCA) is planning to be one of these groups. At the TCA Conference and Exposition, slated to be held this year from Oct. 3-7 in San Diego, users' issues and association activities will be discussed. Users interested in charting the future should attend the conference and participate in these sessions.

Professionals need to stay current with new approaches and maximize the effectiveness of their positions within the organization and the industry. The alternative is professional stagnation and battling for budget justification amid a growing sense of management doubt about the strategic value of networking and the networking staff.

Viable user groups provide an effective means for professionals to accomplish all these objectives. I've seen information technology managers (and their departments) wither under sharp questioning by management, and I've seen winners respond with a volley of information about how other users have solved similar problems. By relating the successes and failures of others, the best managers learn from their collective experiences about which options exist and which of these are most likely to succeed. Their imaginations are stimulated enough to invent new and unique approaches to their situations. They save time and money.

When I attend user group meetings, I'm often impressed by how clever and creative some of my peers are. Because they're my friends, they'll often share their doubts, mistakes and secrets with me about the use of new technologies in their business applications. I can get real answers from my peers about what strategies worked and didn't work, as well as cost information and results achieved.

Another benefit of user group membership is collective clout. Armed with objective information enhanced by my own experiences, knowledge and opinions, I can usually persuade doubters to let me try new technologies to meet business requirements. And when it comes to dealing with the bureaucrats who regulate, tax and legislate, an industrywide user group has infinitely more influence, time and information than the individual.

Effective user groups can do an outstanding job of sorting through the hype and fluff of new technology claims and present information on trends in a sensible, understandable manner.

Network professionals never get beyond the need for staying current. That's why the TCA encourages user groups to meet at its annual Conference and Exposition, and offers complementary exhibit passes and meeting rooms, as well as discounted registrations.

Leading industrywide user organizations can provide conference and exposition themes that force participants to address what's important, not just what's different about a service or product. I am excited by the approach the TCA is taking with its Solutions Center, which brings together networked technologies in a real-world environment.

I don't have the time or budget to go around to see what's new from every technology of interest. Trade shows allow me to comparison shop, ask questions and challenge current and potential suppliers in a neutral environment. I can get answers to any question from a dozen leading suppliers in minutes. Obviously the suppliers gain access to a select group of potential customers, too.

You know your needs, problems and strengths better than anyone else. There are a number of groups that have outstanding user members and stay in touch with trends and suppliers. User groups should plan to meet at this year's TCA Conference and Exposition. Check it out and see if you can afford not to participate.

Founded in 1961, the TCA is a national nonprofit organization that exists for the advancement of professional and technical knowledge in the telecommunications industry. A typical member company is a business user of voice and/or data communication systems. The TCA has 11 regional chapters and is comprised of more than 900 diversified organizations from both the private and public sectors. For more information on the TCA Conference and Exposition or to preregister your group's members, call the TCA at (909) 483-3890.

➾ Pyles is manager of network communications services for The Ryland Group, Inc. in Columbia, Md., and former president of the TCA's Maryland chapter. She can be reached at (410) 715-7403.

Letters

All in the family

Thanks for Mark Gibbs' column "If networks were people" (June 27, page 28); we had a good laugh here.

An addendum:

Tandem's Expand: This is your older cousin Norbert.

He's supposed to be a whiz in the financial world, always on the go, with a slew of contacts, but nobody knows much about him or how he does it.

X.25: This is your truly nutty distant uncle Werner.

He travels in an indeterminate way from here to there with his head in a cloud and always manages to find a nice, padded location when he arrives.

John Sisson
Senior systems analyst
System Integrators, Inc.
Sacramento, Calif.

Got your number

Mark Gibbs' "If nets were people" column has got to be the funniest piece I've read in a year. I only wonder what he would have said about Unix.

Unix: These are the people working at your phone company. They're experts at communication and are very efficient. They'll help you talk to anybody, as long as you know 27 different phone numbers and can dial in cryptic abbreviations.

Rich Ellis
PC support specialist
Hutchison & Associates, Inc.
Raleigh, N.C.

Midday humor

It's 12:30 p.m. at IBM Australia as I write this note to you. I have just read Mark Gibbs' article on the network family that was kindly forwarded to me by a colleague of mine in Singapore.

I just want to say a double thank you, first for enlightening me on networks and second for giving me a good laugh. It was badly needed.

Mike Voris
DAP team leader
Application Development
Technology
IBM
Sydney, Australia

Play it again

I just read Mark Gibbs' column "If networks were people." I enjoyed it so much, I was wondering what the protocol might be to reprint it in a user group newsletter.

Laurel Johnson
Membership director
Puget Sound NetWare Users Group
Seattle

Editor's response: Reprinting the column requires that you provide a line saying "Copyright (c) 1994 by Network World."

OLE at bay

Regarding your article "Microsoft's OLE can be network Trojan horse" (June 27, page 1):

Congratulations on tackling an issue that I think receives insufficient attention. I suggest a more detailed article comparing Object Linking and Embedding (OLE) and Common Object Request Broker Architecture (CORBA) or CORBA-compliant implementations such as IBM's System Object Model.

This is a vital issue since right now many user applications are being developed for OLE without an understanding of the difficulties and dangers involved. It is my opinion (I haven't had time to verify this)

See Letters, *page* 42

Mystery letter

In the July 11 issue, *Network World* published what it thought was a Letter to the Editor from Arthur Tisi, an IS employee at the Metropolitan Museum of Art in New York. Mr. Tisi last week said he never sent such a letter. The correspondence was sent from CompuServe by way of Internet mail.

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Not yet ready for prime time

New wave of **net management apps** flood market, but basic flaw leaves users floundering with integration headaches.

BY JOHN RYMER

Users shackled with the daunting task of keeping client/server environments across the enterprise up and running face an even tougher challenge in selecting the right mix of net management applications.

Independent software vendors (ISV) and equipment manufacturers have gone into overdrive to write a new generation of applications that sort, analyze and act on management data gathered by such network management platforms as Hewlett-Packard Co.'s HP OpenView and SunConnect's SunNet Manager.

The prior generation of management applications are monolithic bundles of monitoring and control code that include their own proprietary platforms. These older applications aren't equal to today's needs.

While the onslaught of new-generation applications gives users more choices, the applications aren't yet fully capable of working together to solve overall client/server environment management woes. This lack of integration places greater demands on users to shop for applications that not only meet specific management needs, but also can be readily integrated with other applications.

And the availability of easily integratable applications seems to be right around the corner, giving users that can postpone a strategic product commitment a reason to wait. ISVs will strive over the next year to reach the ultimate goal of enabling net managers to mix and match different vendors' applications that support any of the International Standards Organization's five areas of management functionality: fault, configuration, performance, accounting and security.

Application interfaces, for instance, will become more open, making it possible for users to draw network fault information from one application, performance statistics from another and cost information from a third when rectifying problems. Currently, this type of application data sharing is based on rudimentary methods that include support for common file formats and data translating gateways.

ISVs have thus far concentrated on simply developing the new generation of modular and customizable applications that rely on the management platform to provide basic monitoring and control functions, as well as management information and user interfaces (see graphic, page 34).

Likewise, more effort has gone into enabling these new applications to manage many different kinds of devices, or network elements, made by many different vendors.

"We select management applications based on their ability to handle many devices," says David Tokuhisa, a systems analyst at Abbott Laboratories, Inc. in North Chicago.

The new applications manage multiple devices primarily by using the Simple Network Management Protocol, SQL and other standards.

However, the transition from the earlier monolithic model to the new, open model is not yet complete.

For example, some management applications such as Computer Associates International, Inc.'s (CA) CA-UniCenter that are advertised as being new and open are essentially monolithic in nature. These applications are typically older products that vendors haven't yet completely migrated from legacy systems to open management platforms.

NETWORK WORLD SHORT LIST 1994

Net management applications

- ✓ **Compuware Corp.** *EcoTools*
- ✓ **LEGENT Corp.** *Paradigm*
- ✓ **Make Systems, Inc.** *NetMaker XA Suite of Tools*
- ✓ **NetLabs, Inc.** *NetLabs/AssetManager*
- ✓ **3Com Corp.** *Transcend WorkGroup Manager*

Complete details about The Short List appear on page 36.

MARKET STRUCTURE

At the high end of the market are applications that seek to unify management of diverse network devices, including legacy systems that are spread across large enterprises. To do so, these applications use more than one network management protocol with the industry de facto SNMP, ISO's Common Management Information Protocol and IBM's Network Management Vector Transport among the most popular.

High-end applications manage large volumes of data, typically storing information in relational database management systems. ISICAD, Inc.'s Command 5000 stores inventory information about managed devices in Oracle Corp.'s Oracle7 or Sybase, Inc.'s SQL Server, for example. ISICAD plans to support other popular relational DBMSs in the future.

High-end applications carry price tags of $10,000 and up. Their ranks include Boole & Babbage, Inc.'s Command/Post, Make Systems, Inc.'s NetMaker XA Suite of Tools, ISICAD's Command 5000 and HP's OpenView OperationsCenter.

Mid-range applications serve the needs of large Unix networks that aren't as complex as multiprotocol enterprise networks. Applications in this segment tend to be specialized, offering a fair amount of in-depth functions within the ISO management areas they support and range in price from $1,000 to $10,000.

For example, SAS Institute, Inc.'s SAS/CPE Software for Open Systems offers rich performance analysis functionality, including a sophisticated time-series data management feature that can create net performance profiles. NetLabs, Inc.'s NetLabs/AssetManager is a complete package for gathering and managing the information needed to handle network elements as financial assets. Remedy Corp.'s Action Request System automates user procedures to resolve net and systems problems.

SAS/CPE Software for Open Systems and many other mid-range products can become high-end offerings with the addition of relational DBMSs and multiple management protocols. In fact, many current mid-range applications were originally designed to run on mainframes. Thus, many of these applications are compatible with high-end management systems.

At the low end are applications primarily designed to keep local-area networks of personal computers running. Low-end applications employ a single protocol, support a limited variety of network devices and are designed to manage the typical LAN workgroup of fewer than 50 users.

The low-end management applications market offers

Continued on page 34

inside

- ▶ Do-it-yourself management for end users. Page 34.
- ▶ Buyer's Guide chart pinpoints which applications do what. Page 38.
- ▶ Management platforms lay the foundation for applications. Page 40.
- ▶ Readers tell how they manage to pick applications. Page 40.

Continued from page 33

users fairly limited choices. Most of the products bundle a broad range of management functions into a single package priced at $1,000 or less. But these applications don't offer much depth in any of the functions they support.

The platform foundation

An open network management platform such as Hewlett-Packard Co.'s OpenView or SunConnect's SunNet Manager provides the common foundation for running management applications and collecting management data from across the enterprise.

After a slow start, support for open network management platforms is catching on among developers who can use a set of application program interfaces to enable their management applications to utilize core platform services.

A network management platform is basically a collection of software modules that collect a variety of data from network elements and presents that data for use by applications. A management application analyzes, correlates and acts on the collected information. Many applications supplement platform services by using their own methods for gathering additional information about network elements or sending corrective commands to wayward devices.

At a base level, the management platform uses a common network management protocol such as the Simple Network Management Protocol to poll agent software on network devices. Typically, this polling first gathers such information as device names and network addresses used to build a configuration database. The platform may use ASCII files or a relational database management system to store this information.

The management platform can then poll agents around the network for status information and store that data in the database. The management platform can also present status information to management applications for processing.

Individual applications may use their own supplemental services to instruct the platform to gather additional information about network elements. For example, an accounting application may determine which department is using a particular device to allow chargebacks for that device. The application can also use its own services to direct the management platform to send commands to one or more network elements.

These supplemental services are made possible when the application vendor builds extensions to the basic SNMP Management Information Base into its product, extensions that the platform is unaware of without the aid of application commands.

Some application vendors are also broadening SNMP support beyond what the platform offers by embracing such new features as SNMP's related Remote Monitoring standard that gathers network traffic statistics or even Version 2 of SNMP.

Few of these low-end applications are modular. Most include management platform and application functionality in a single package. As open net management platforms, such as Novell, Inc.'s NetWare Management System, become more widely available for PC LANs, vendors will undoubtedly produce more modular applications (*NW*, June 6, page 48).

Examples of low-end applications are 3Com Corp.'s Transcend WorkGroup Manager, SynOptics Communications, Inc.'s Lattis EZ-View and McAfee Associates, Inc.'s LAN Support Center.

MAKING THE SELECTION

With all the applications on the market today and the inherent lack of integration among them, users will have to purchase a combination of applications that together provide the required functionality, and make the best of it.

Jim Smilanich, network management specialist at a large Midwestern printing company, has representative requirements. He is looking for a suite of network management applications that yield a comprehensive view of his environment but isn't having much luck.

"We want to be able to have a robust set of third-party applications vendors and be able to integrate their products," he says. For example, Smilanich wants to standardize on a single hub management application that can work with products from SynOptics, Cabletron Systems, Inc. and others. Further, he wants those applications to integrate easily with applications that provide trouble-ticketing, remote management and other functions.

None of the existing network management applications meets these requirements, Smilanich says. The industry seems to be moving more toward open applications interoperability, however, and he hopes to see progress toward his vision of network management within the next two years.

For now, users will need to evaluate applications on the basis of which ISO management areas they support and how well they support them. Vendors typically implement portions of two or more ISO functional management areas within a single application, one of which is supported more strongly than the others.

FAULT MANAGEMENT

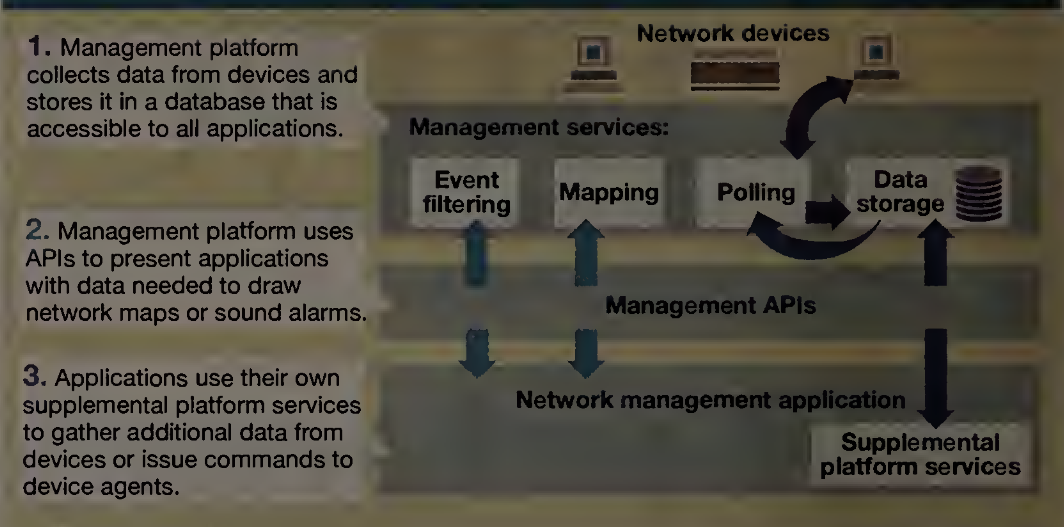
Fault management applications are a front-line defense, identifying network element failures and helping to repair problems. Fault management applications gather status information from such devices as hubs, routers, bridges, modems, network interface cards (NIC), servers and other network elements.

Once the information is gathered, fault management applications help users compare, contrast and filter the data to determine the root cause of such network problems as link failures, slow performance in networked applications and temporary lapses in access to servers, printers and other resources.

Fault management is the core function of HP's OpenView OperationsCenter, LEGENT Corp.'s Paradigm, Remedy's Action Request System, Auto-trol Technology Corp.'s Konfig and 3Com's Transcend WorkGroup Manager.

A basic difference in these applications is the amount of information they can gather and manage. For example, HP's OpenView OperationsCenter correlates management information transmitted via SNMP, as well as information obtained from systems and applications log files, operating system messages, and external programs such as scripts. OpenView OperationsCenter obtains SNMP data using HP's OpenView platform but includes its own agents to obtain the other information.

Separation of platform and application services



1. Management platform collects data from devices and stores it in a database that is accessible to all applications.
2. Management platform uses APIs to present applications with data needed to draw network maps or sound alarms.
3. Applications use their own supplemental platform services to gather additional data from devices or issue commands to device agents.

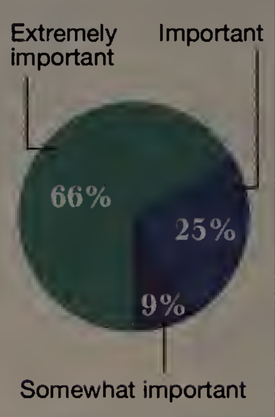
SOURCE: PATRICIA SEYBOLD GROUP, INC., BOSTON

GRAPHIC BY SUSAN SLATER

Not all applications go to these lengths to obtain management information. Many just make do with SNMP data obtained from an open management platform. These applications are blind to operating system events on network devices, for example.

Most fault applications provide additional features to help users solve problems. The most common feature is trouble tickets, which are a simple mechanism to report and track problems and repairs. A trouble ticket is like a folder that contains the available information about a network problem, the person or application reporting the problem, the identity of the machine experiencing the problem, and other such information. The trouble ticket can be passed to a management specialist in order to help expedite a solution for the problem. Organizations can also assign priority levels to trouble tickets, ensuring that major problems are solved first.

The importance of fault management applications, according to a survey of *Network World* readers:



SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

LEGENT's Paradigm has a trouble-ticketing system that includes a detailed definition of network management problem information and predefined problem resolution procedures. To effectively use trouble-ticketing systems, users must categorize problems and design management procedures to ensure that problems are handled efficiently.

By providing a baseline of problem categories and a problem resolution procedure, Paradigm can dramatically reduce the setup time for trouble ticketing.

Paradigm and other fault management applications incorporate a variety of other functions, as well. Indeed, most fault management applications incorporate elements of configuration management and security management to complement their basic problem ID functions.

However, the configuration and security features found in fault management applications are not as robust as those found in applications designed explicitly for those functions.

In addition, many fault management applications provide rules-based problem resolution systems that allow organizations to run programs, reconfigure network elements, shut down systems and take other actions in response to a given network event or series of events. Some of these rules-based systems are bona fide expert systems. Others are simple table-driven applications built using basic scripting languages.

In addition, diagnostics and troubleshooting tools are an important part of fault management. Although many fault management applications advertise diagnostics as a feature, few have strong features of this type. Most of these applications simply retrieve current values from an SNMP Management Information Base (MIB) that will help users narrow down the cause of a problem. However, finding the actual root of the problem requires the use of diagnostic tools that are designed to delve deeper into the device.

Therefore, diagnostic facilities found in fault management applications are not as robust as the diagnostic utilities sold with individual net elements and probably never will be. This means that fault management applications must ultimately be integrated with a variety of third-party diagnostic utilities.

PERFORMANCE MANAGEMENT

Performance management applications help organizations identify bottlenecks in network operations, understand the work load an element is carrying at a given moment and predict how a network will perform under higher work loads in the future. They do so primarily by monitoring the traffic passing between network elements and comparing current usage rates to user-defined benchmarks.

In a classic example, a performance management package will monitor the number of packets per second being transmitted over a link. If the rate drops below a user-defined minimum, the package will sound an alarm to an operator using the net management plat-

Continued on page 36

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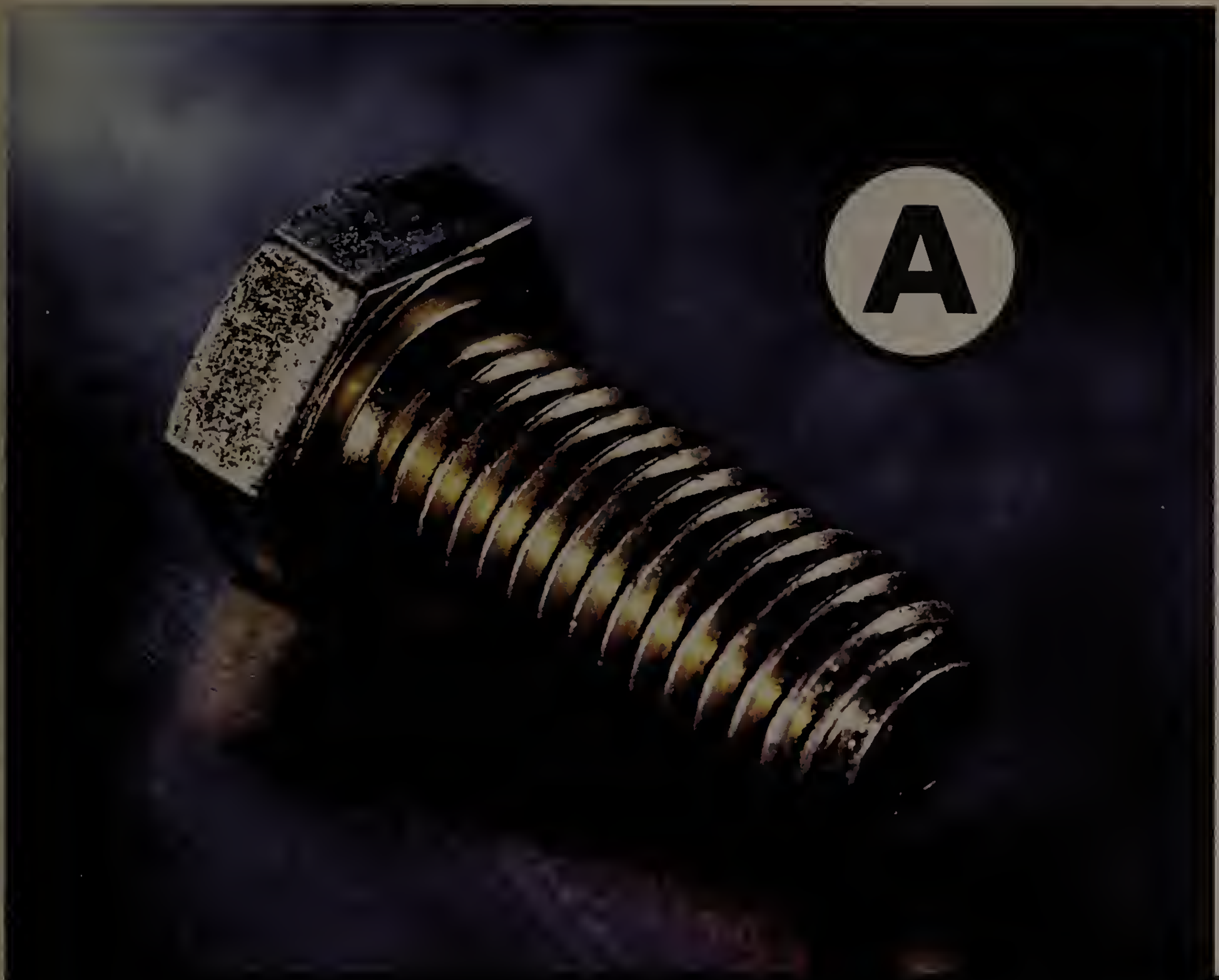
Network World invites you to participate in a product survey for an upcoming Buyer's Guide on T-1/T-3 multiplexers. If you would like to receive a survey form, please call (800) 622-1108, Ext. 461, and leave a message for Cheri Paquet, assistant editor, or Barbara Wierzbicki, Buyer's Guide editor. Be sure to include your voice and fax numbers when requesting a product survey. Vendors must contact *NW* no later than Aug. 19 to receive a survey form.



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Net mgmt. apps

The Short List highlights products Network World *recommends you examine during the purchasing process for network management applications. Each of the products named to this Short List excel in one of the following management functions: asset management, database server management, LAN management, network optimization, and tuning and problem resolution. When used together, the products on this Short List provide top-notch management of an enterprise network. The criteria used to select products for the Short List reflect the needs of users with multivendor enterprise networks. Your criteria may differ.*

■ Compuware Corp.
EcoTools

EcoTools is the first application to handle the critical function of managing network databases. Even though database servers are a key component of client/server applications, conventional network management products are blind to their status and internal operations. EcoTools corrects this oversight by performing fault, configuration and performance management tasks on Oracle Corp. and Sybase, Inc. relational database management systems.

The product deals with database events and conditions, such as fragmentation of database tables, and automates problem resolution. For example, EcoTools lets users define an automated routine that compacts database tables after a given number of fragmentation alarms. A major thrust of development for Compuware is to increase EcoTools' support of standards and its ability to integrate with other applications.

■ LEGENT Corp.
Paradigm

Thanks to comprehensive integration of such functions as trouble ticketing and inventory management, Paradigm hits the mark when it comes to problem resolution. The product offers built-in data and process models to aid net problem resolution. The data model defines how different management events and status messages are related, while the process model defines the sequence of steps personnel must take to report and solve a problem.

Paradigm also offers facilities to automate problem resolution and uses a robust network inventory function to provide more detailed device information, such as warranties and service agreements, than other products. Paradigm is modular and runs on Hewlett-Packard Co.'s HP OpenView and SunConnect's SunNet Manager.

■ Make Systems, Inc.
NetMaker XA Suite of Tools

NetMaker XA is a top-rate suite of interactive network planning tools that fully address the important areas of network optimization and tuning. The tools enable users to estimate the cost of building local- and wide-area networks, as well as perform survivability analysis. NetMaker XA is highly modular and flexible, in addition to being an excellent complement to management applications that address trouble ticketing and alarm response by enabling managers to take proactive actions to avert problems down the road.

■ NetLabs, Inc.
NetLabs/AssetManager

With the sole purpose of automatically collecting and maintaining a wealth of inventory information about network elements, NetLabs/AssetManager fills the bill when it comes to asset management. Currently, most organizations maintain records of the devices on their networks using manual procedures. NetLabs/AssetManager supplements the automatic discovery features of HP OpenView, NetLabs' own DiMONS platform, SunNet Manager and IBM's NetView/6000 with a facility that gathers more information about network elements than any other inventory management application and stores this data in a SQL database that is available across the network.

■ 3Com Corp.
Transcend WorkGroup Manager

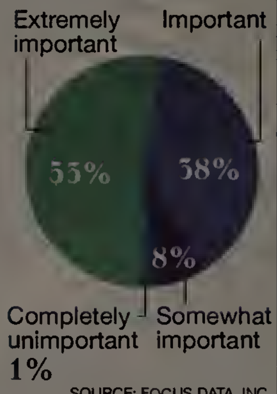
With Transcend WorkGroup Manager, 3Com provides a good basket of functions for managing LANs. The product supports both Transmission Control Protocol/Internet Protocol and Novell, Inc. NetWare Internetwork Packet Exchange (IPX) networks via the Simple Network Management Protocol and can also draw information available via Novell's Open Data-link Interface and Microsoft Corp.'s Network Driver Interface Specification for network adapters. Transcend WorkGroup Manager offers special features for managing 3Com's hubs, bridges, routers and adapters, but it is not a 3Com-specific management application. 3Com offers a version of Transcend WorkGroup Manager for larger environments called Transcend Enterprise Manager, giving users an upgrade path to greater capacity and capabilities.

Continued from page 34

form's graphical user interface. The operator can then look for the root problem causing the drop in traffic.

All performance management applications display statistics in graphical form. Some also include sophisticated statistical routines to support cost analysis, survivability analysis and related chores.

The importance of performance management applications, according to a survey of *Network World* readers:



SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

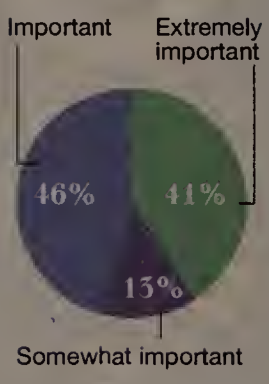
Relatively few of the new management applications tackle performance management as their primary functions. "There is still an absence of information for measuring response times," says Marty Quinlan, network performance specialist for Virginia Power Co. in Richmond, Va.

The reason seems to be that measures of performance haven't been encoded into management protocols yet, and that is largely because measuring performance is not as straightforward as determining the state of a hub port. Performance is determined by a number of interrelated factors, including the speed of network links, the type of internetwork hardware used, the type of servers and server operating system environments in place, and what applications are running.

Performance management applications fall into two categories: statistical analysis software and application monitors. Statistical analysis packages provide a wide range of functions for a limited set of resources. SAS Institute's SAS/CPE Software for Open Systems, for example, provides workload characterization, historical trend analysis, capacity planning and tuning functions, in addition to the basic presentation of performance data.

Compuware Corp.'s EcoTools provides detailed statistics on the performance of Oracle and Sybase database servers only. EcoTools, for example, monitors databases for data fragmentation in a single table across diverse disk sectors. Too much fragmentation can kill database performance.

The importance of configuration management applications, according to a survey of *Network World* readers:



SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

Application monitors check the performance of a broad range of resources. Frontier Software Development, Inc.'s NETscout Manager, for example, gathers performance statistics from Lotus Development Corp.'s Notes, Sun Microsystems, Inc.'s Network File System and other server-based applications. NETscout Manager gathers information about the overall response time for an application, the usage of the application over time and the most frequent users of the application.

By year end, Frontier Software plans to also gather statistics about server retries, database fragmentation and other internal measures of application performance.

CONFIGURATION MANAGEMENT

Configuration management applications help network managers maintain a listing of the operating parameters of hubs, routers, bridges and other network elements, including the names given to those devices. Comparatively few of the new network management applications focus primarily on configuration management for a wide range of devices. Instead, most apply only to a single vendor's equipment.

In most cases, vendors of fault management applications include configuration management features in their products. These applications handle configurations by setting SNMP MIB variables in target devices.

SynOptics' Optivity is a configuration management application that helps to configure a range of network elements, including hubs, routers, bridges, Asynchronous Transfer Mode switches, file servers and even front-end processors. Optivity deals with many network devices using SynOptics' SuperAgents, which can query devices to determine their configuration and then issue corrective commands.

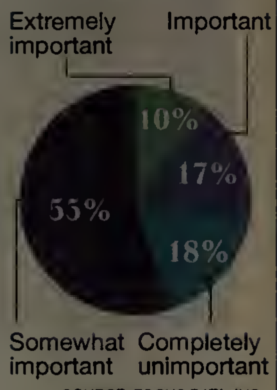
In the future, SynOptics plans to add configuration management of wide-area network equipment, such as multiplexers and private branch exchanges, and of server-based applications, such as electronic mail gateways and databases.

A low-end configuration management application is StonyBrook Services, Inc.'s Router Manager product line, which has individual modules for managing routers made by Cisco, 3Com and Wellfleet Communications, Inc. StonyBrook's products employ separate agents for each vendor's router as opposed to the SuperAgent used by SynOptics.

Electronic software distribution is another technique for managing configurations. Most applications that support configuration management can electronically send files to target devices. For instance, a configuration management application can send program update files to devices and instruct those devices to install the files, thus upgrading programs to the latest release.

Most applications supporting electronic software distribution have both automatic program updates as well as updates that are done at user-defined times. The only mission for ViaTech Development, Inc.'s Xfer Software Transfer is to distribute new versions of programs via file transfer.

The importance of accounting management applications, according to a survey of *Network World* readers:



SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

ACCOUNTING MANAGEMENT

Accounting management applications help to determine the costs of running a network and allocate or charge back those expenses to the appropriate organizational department.

The foundation of accounting management applications is the automatic gathering of data about network elements and their usage. This activity takes place even as new elements are added and old ones are eliminated. Up-to-date inventory records are a prerequisite for automated cost measurement and chargeback.

Comparatively few of the new management applications handle inventory information, measure costs and automate cost allocation. Of those applications that do perform accounting management, the majority focus on simple inventory tracking and fall down when it comes to cost measurement and allocation.

The key differentiator among accounting applications is how much information they gather about network elements and how often they gather it.

The best of these applications, such as NetLabs' NetLabs/AssetManager, will gather dozens of pieces of information about a network node or device, including its manufacturer, model, owner, date of installation and warranty information. The agents used to gather this data can be configured to poll devices at a variety of intervals and to filter informa-

Continued on page 39

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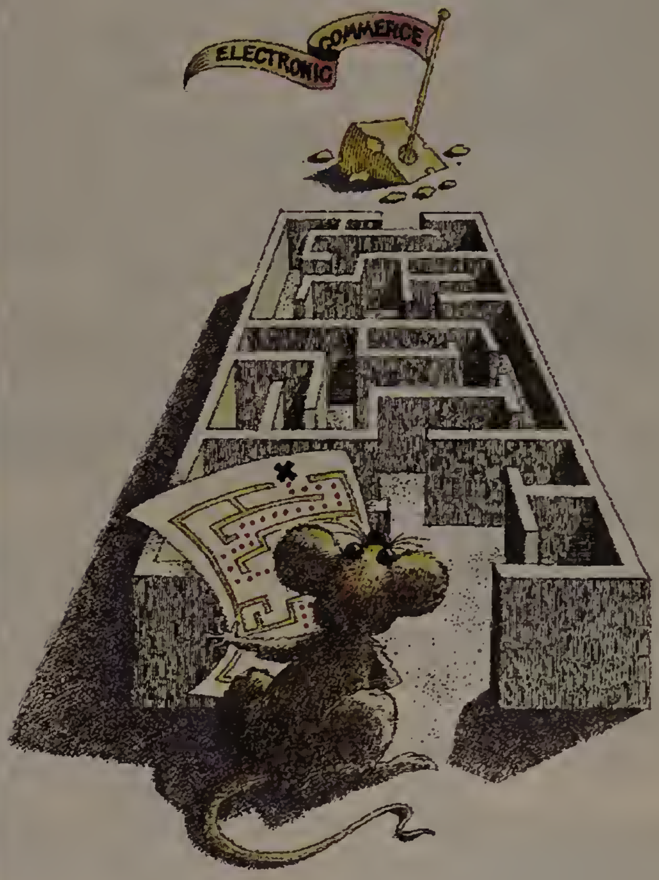


Network management applications

Company	Product	Mgmt. platform	Mgmt. protocol	Fault mgmt.	Performance mgmt.	Configuration mgmt.	Accounting mgmt.	Security mgmt.	Automation facility	Data sharing	Price
		D = DIMONS N = NMS NV = NetView/6000 OU = OpenView for Unix OW = OpenView for Windows S = Spectrum SM = SunNet Manager O = Other	C = CMIP N = NMVT S1 = SNMPv1 S2 = SNMPv2 O = Other	D = Diagnostic and trouble shooting E = Event notification L = LAN packet analysis and profiling T = Trouble ticketing	H = Help desk N = Network design O = Other	C = Changes E = Electronic software distribution T = File tracking O = Other	C = Chargeback I = Inventory S = Software license O = Other	A = Account/ permission mgmt. E = Event monitoring O = Other	E = Expert system S = Script	F = File format G = Gateway S = SQL database	C = Client S = Server
Accugraph Corp. (800) 678-1061	Accugraph's Physical Network Manager	NV, OU, SM	S1	D, T	H, N	C	I, S	O	E, S	S	C: $1,200 S: $9,200
ALLINK Network Management Co. (800) 848-8384	ALLINK Operations Coordinator	D, N, NV, OU, S, SM, O	C, N, S1, S2	D, E, T	H, O	C, T, O	I, O	A, E, O	E, S	F, G, S	C: $4,000 S: $18,000
Almanack, Inc. (301) 927-3090	Almanack Maintenance	O	O	D, E	O	E	S	E	S	F	C: $1,080 (1)
Arkhon Technologies, Inc. (310) 921-8848	AMCS/Device Manager	NV, OU, SM, O	S1	D, E, T		C, E, T	I	E	S	F, S	S: $3,500-$10,000
Armon Networking, Inc. (805) 965-0859	OnSite	NV, OU, SM, O	S1	D, E, L, T	N					F	C: $4,000-$9,000
AT&T Global Information Solutions, Inc. (513) 445-5000	Software Manager, Operations Advantage, Frame Relay Data Manager, Definity Management Gateway, Alarm Interfaces	O	S1	D, E	H, O	C, E, T	C	A, E	S	F, G	C: $50+ S: $2,000+
Auto-trol Technology Corp. (303) 252-2354	Konfig	NV, OU, SM	S1	T	H	C	I		S	F, S	C: $31,150 S: $1,995-$4,995
Boole & Babbage, Inc. (408) 426-3484	Command/Post	D, N, NV, OU, S, SM	S1	D, E	H				S	S	S: $60,000+
Bridgeway Corp. (508) 683-3626	Event IX	D, NV, OU, S, SM, O	N, S1	D, E	H	C		E	E, S	F, G, S	C: $1,000-$1,500 S: $15,000 (2)
Chipcom Corp. (800) 228-9930	ONdemand Network Control System	NV, OU, OW, SM, O	C, N, S1	D, E, L	O	C	O	A, E, O	S		S: $895-$4,995
	ONdemand LANsentry Statistical Analyzer	NV, OU, SM	S1	E			O			F	S: $3,300
	ONdemand LANsentry Packet Decoder	NV, OU, SM	S1	L	H, O					F	S: $3,300
CNT/Brixton Systems, Inc. (617) 661-6262	BRX OpenView	OU	C, N, S1, S2	D, E, T	H	C		E	S	G	C: $8,000
	BRX SunNet Manager	SM	C, N, S1, S2	D, E, T	H	C		E	S	G	C: $8,000
Computer Associates International, Inc. (800) 225-5224	CA-UniCenter	NV, OU, SM	S1, S2	E, T	H	O	C	A, E	S	S	S: $7,000+
Compuware Corp. (800) 368-4326	EcoChargeBack	D, NV, OU, SM	S1		O		C		S	S	S: $8,000+
	EcoTools	NV, OU, SM	S1	D, E	O	C, T	I	A, E	S	F	S: $20,000+
Concord Communications, Inc. (508) 460-4646	Trakker	SM	S1	D, E, L	N		C	O		F, S	S: $20,000
CrossComm Corp. (800) 388-1200	Internetwork Management Software	OW, O	S1	D, E, L, T	N, O	C, E, T	I, O	E, O	S	F, S	S: $5,995
Diederich & Associates, Inc. (818) 799-9670	NetScript/6000	NV, OU	N, S1	D, E, T	H	T			S	F	C: $2,000-$10,000 S: $8,000
Enterprise Software Corp. (310) 305-7721	Net/OverView	O	N	D, E	H				S	F	S: $30,000+
Frontier Software Development, Inc. (800) 851-5700	NETscout Manager, NETscout Probe	NV, OU, S, SM, O	S1	D, E, L	O		C			F, G, S	C: $995-$2,995 S: $2,995-$3,495
Hewlett-Packard Co. (800) 637-7740	HP OpenView OperationsCenter	OU	S1	E, T	H				S	S	C: $200-$2,000 S: $30,000
	HP OpenView Network Node Manager	OU	S1	D, E	H	C, T	I	E	E, S	F, S	S: $15,750
Hughes LAN Systems, Inc. (800) 448-4437	Hughes 20/20 Enterprise Hub Manager for Windows	OW	S1	D, E		C					C: $2,995
IBM (800) 426-2255	IBM Distributed Console Access Facility 1.2	O	O	D	O	O					C: $180
	LAN Network Manager 1.1	O	C, N	D, E, L, T	H, O	C, E, T		O	S	S	S: $5,240
ISICAD, Inc. (800) 634-1223	Command 5000	D, O	S1	D, E, T	H, N	C, O	I		S	F, G, S	C: $25,000
	Command Help Desk	D	S1	E, T	H				S	F, G, S	S: $12,500
Landmark Systems Corp. (800) 488-1111	The Monitor for Unix	NV, OU, SM	S1	D, E	H, N, O				S	F	C: $750-$5,200 S: $5,000
LANNET, Inc. (714) 752-6638	MultiMan	NV, OU, SM	S1	D, E, L		C, E	I	A, E		F, G	S: $3,995
LEGENT Corp. (206) 688-2000	Paradigm	N, NV, OU, SM	C, S1, S2	E, T	H		I		E, S	F, G, S	C: $795 S: $16,500 (3)
Make Systems, Inc. (800) 545-6253	NetMaker XA Suite of Tools	NV, OU	S1	L	N	C, T, O	C, I			F	S: $6,995-$14,995
McAfee Associates, Inc. (408) 988-3832	LAN Inventory	N	O		O	C, T	I	E		F	S: $699-$999
	LAN Support Center	N	O	D, T	H	C, E, T	I, S	A	S		C: $999+
	Net Tools	O	O	T		C, E		A, E	E, S		C: $49 S: $149
	NETremote	N	O	O		C, O	O	O	S		C: $699-$999
	PS-Print	O	O				O				S: $499-$699
NetLabs, Inc. (800) 525-5645	NetLabs/AssetManager	D, NV, OU, SM	S1		H	C, T	I		S	F, S	C: $2,000-$4,000 S: $5,000
Network Application Technology, Inc. (800) 474-7888	Multi-Vendor Support Series	NV, OU, SM, O	S1	D, L	N						S: $1,995
Network General Corp. (800) 764-3337	Distributed Sniffer System	N, OU, OW, SM, O	S1	D, E, L	N, O	C, O	O	O	E	F	C: $4,995 S: $3,495-$9,495
Novell, Inc. (800) 638-9273	NetWare Hub Services 2.0	N, O	S1	D, E	N, O	O	O	O			S: $250

Network management applications

Company	Product	Mgmt. platform	Mgmt. protocol	Fault mgmt.	Performance mgmt.	Configuration mgmt.	Accounting mgmt.	Security mgmt.	Automation facility	Data sharing	Price
		D = DIMONS N = NMS NV = NetView/6000 OU = OpenView for Unix OW = OpenView for Windows S = Spectrum SM = SunNet Manager O = Other	C = CMIP N = NMVT S1 = SNMPv1 S2 = SNMPv2 O = Other	D = Diagnostic and trouble shooting E = Event notification L = LAN packet analysis and profiling T = Trouble ticketing	H = Help desk N = Network design O = Other	C = Changes E = Electronic software distribution T = File tracking O = Other	C = Chargeback I = Inventory S = Software license O = Other	A = Account/ permission mgmt. E = Event monitoring O = Other	E = Expert system S = Script	F = File format G = Gateway S = SQL database	C = Client S = Server
Novell, Inc.	NetWare LANalyzer Agent 1.0	N, O	S1	D, E, L	N	C	O	O	E		S: $1,495-$2,495
	NetWare Management Agent 1.5	N	S1	D, E	O	C	O	E	E		S: $495-$150,000
Optical Data Systems, Inc. (214) 234-6400	LanVision	NV, OU, OW, SM	S1, S2	D, E, L, T	H	C, E, T, O	C, I, S	A, E	S	F, S	C: $2,475
OpenVision (510) 426-6400	OpenV*Event Manager	NV, OU, SM	O	D, E	O	O	O	E	S	S	C: $100-$10,000 S: $3,200
Peregrine Systems, Inc. (800) 638-5231	OpenSNA	NV, OU	N, S1	D, E, L		C			S	F	C: $13,500 S: $16,000
	Peregrine Network Management System Client/Server	OU	S1	E, T	H, O	C, O	I	E	E, S	F, S	S: $25,000 (4)
	StationView, ServerView	OU, O	S1	D, E	O	C, T, O	O	A, O	S	F	S: $7,000-$8,000 (5)
Proteon, Inc. (800) 830-1300	OneView	O	S1	D, E, T	H, O	C, O	I	A	S	F	S: $3,995-$11,995
Remedy Corp. (415) 903-5200	Action Request System	NV, OU, OW, SM, O	C, S1, S2	T	H	C, T			E, S	F, S	C: $1,000 S: $6,500
SAS Institute, Inc. (919) 677-8000	SAS/CPE Software for Open Systems	O	S1, S2		O					F	S: $2,820+
StonyBrook Services, Inc. (516) 567-6060	Router Manager for Cisco, Wellfleet or 3Com	N, O	S1	D, E, T	H, N, O	C, E, T				F, S	S: $1,995
SynOptics Communications, Inc. (408) 988-2400	AssetManager	NV, OU, SM	S1			C	I, S		S	F, S	S: $14,995
	ATM Network Management Application/Connection Management System	SM	S1	D, E, L, T	H, N	C, T	I	A, E	E, S	F, G, S	S: $3,495-$4,495
	Lattis EZ-View	O	S1	D, E, L	O	O					C: $695
	LattisWare	NV, OU, SM	N, S1	D, E, L, T	H, N, O	C, E, T, O	I	A, E, O	E, S	F, G, S	S: $6,795
	Optivity	N, NV, OU, OW, SM	N, S1	D, E, L, T	H, N, O	C, E, T, O	I	A, E, O	E, S	F, G, S	S: $3,495-$5,995
3Com Corp. (800) 638-3266	Transcend Enterprise Manager	O	S1	D, E, T	H	E		A			C: $2,995
	Transcend LANplex Management Software	OU, SM	S1	D, E	O	E, T, O		O		F	C: $4,995
	Transcend LinkBuilder FMS Manager	OU, SM	S1	D, E	O	C, O		A, E			C: $2,500
	Transcend LinkBuilder MSH Manager	OU, SM	S1	D, E	O	C, O		A, E			C: $2,500
	Transcend LinkBuilder Token Ring Management Software	NV, OU, SM, O	S1	D, E, L, T	H, N	C, E, T	I	E			C: $2,995-$4,995
	Transcend NetBuilder Manager	OU, SM	S1	D, E	O			A		F	C: $3,000 S: $3,000
	Transcend WorkGroup Manager	O	S1	D, E, T	O	C, T	I, O	A			C: $495
Trellis (508) 485-7200	Expose Distributed Network Manager 2.0	O	S1	D, E					S	F	S: $1,495
UB Networks, Inc. (800) 777-4526	NetDirector Series, Net Assistant, FocusView Series Applications, SecureDomains	OU	S1	D, E, L, T	H, N	C, T	I	A, E	E	F, S	S: $795-$20,000
ViaTech Development, Inc. (800) 898-8324	Xfer Software Transfer	NV, OU, SM	S1, S2			E, T			S	F	C: $20-$700 S: $29,995
Wandel & Goltermann Technologies, Inc. (919) 460-3300	IDMS Manager	NV, OU, SM	S1	D, E, L	O	C, E, O	S	E	S	F	C: $5,000 S: $3,000
Wellfleet Communications, Inc. (508) 670-6888	Site Manager	NV, OU, S, SM, O	S1	D, E		C, T		E			C: $100-$200
Xyplex, Inc. (508) 952-4700	Control Point 2.1	OU, OW, SM	S1	E		C, E, T	I		S	F	C: $2,195-$2,995

Products highlighted by color were selected for The Short List.

Chart compiled by Chen Paquet

FOOTNOTES:
(1) Pricing includes server.
(2) $1,000-$3,000 for application developer interface modules.
(3) Includes price of client.
(4) Pricing includes base system server plus modules.
(5) Plus $400 to $600 for each NetWare server managed.

CMIP = Common Management Information Protocol
NMVT = Network Management Vector Transport
NMS = NetWare Management System

Continued from page 36

tion locally before forwarding it to the application's main database. User-defined polling and filters help prevent the application from flooding the network with its own agent communications.

NetLabs/AssetManager relies on special agents to gather a range of information about network elements, including whether the device is on an Ethernet or token ring, the type of power supply it uses and the media type it supports, as well as its read-only memory identification, firmware version and boot host.

Also, the NetLabs/AssetManager agents can be configured to report changes in the net composition as they happen. For example, if a user replaces an Intel Corp. 80286-based PC with a multimedia PC on the network, a NetLabs/AssetManager agent will detect the new device and discover that it has a CD-ROM drive, a 300M-byte hard disk and a different NIC. That information will be shuttled back to the management system for storage.

Chargeback, a well-established capability in mainframe installations, is difficult to obtain in any of the new network management applications. Chargeback is a systems management discipline that has been slow in coming to distributed environments.

However, chargeback is available from CA's CA-UniCenter and Concord Communications, Inc.'s Trakker. Both products track usage of Unix servers and their networks, allow users to attach monetary values to those resources and let users issue bills for usage of those resources to the appropriate parties.

SECURITY MANAGEMENT

Security management applications monitor and control information about passwords, access control lists, security logs and encryption facilities in a client/server environment. Currently, there aren't many applications that fully address security in distributed network environments.

For the most part, the security applications listed in the chart starting on page 38 address the function as an add-on to their primary fault management focus. Applications that support security features typically gather information about security incidents along with other types of fault management events. For example, five consecutive unsuccessful logon attempts might be classified as a security event, prompting the application to sound an alarm.

UB Networks, Inc.'s NetDirector series of fault management applications collect security event data and help network managers maintain information about user permissions in the environment. But the NetDirector series of applications does not manage encryption facilities.

To be fair, none of the applications explored

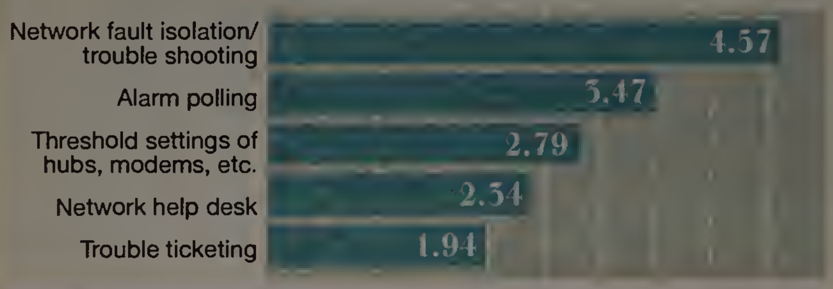
Continued on page 40

Reader views on network management applications

Based on 100 interviews.

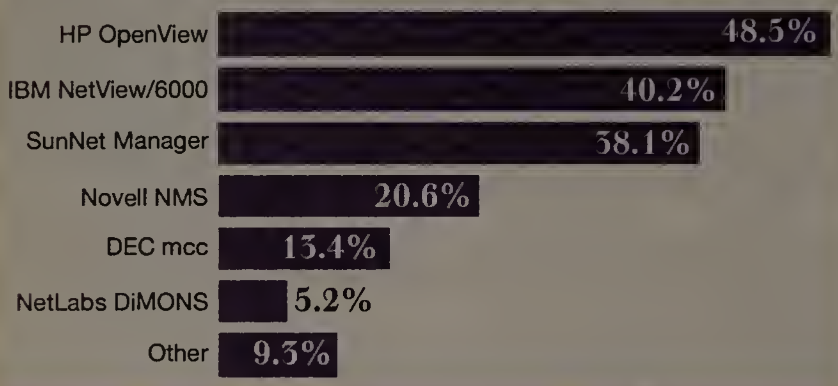
Key reasons for selecting a network management application

Highest score is 5.



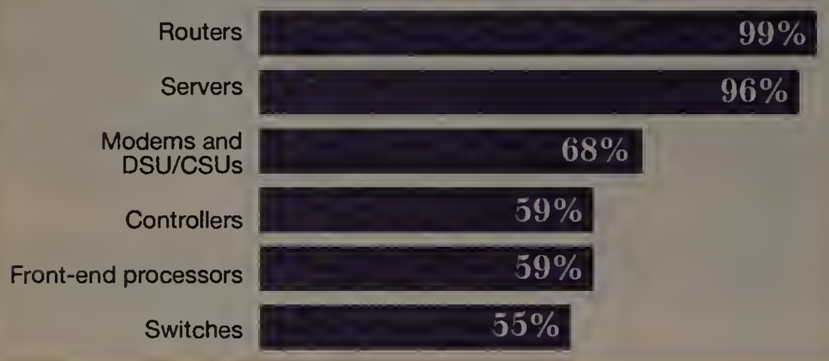
Which of the following network management platforms does/will your organization use?

(Multiple responses allowed.)

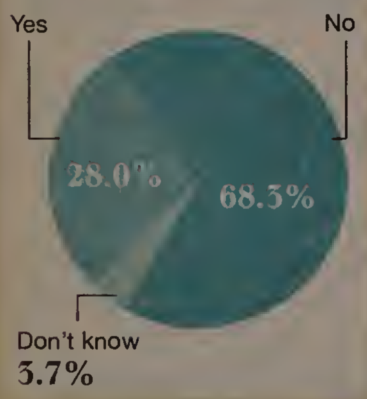


Which of the following network elements do/will you control using a network management application?

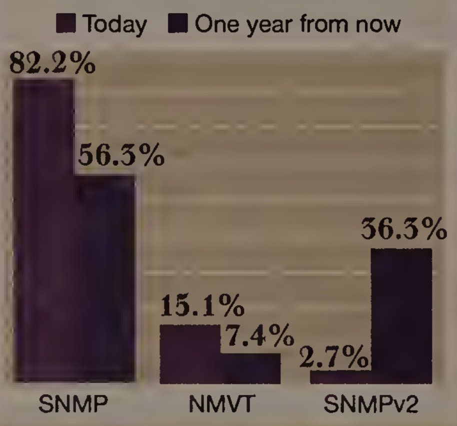
(Multiple responses allowed.)



Do you think that the management applications used in your organization can adequately share data?

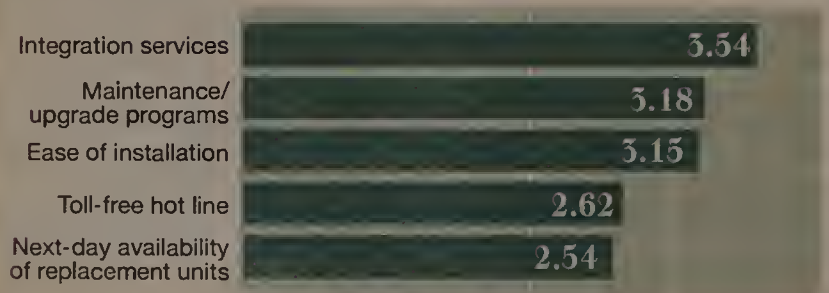


Which is the most important net management protocol your organization uses/will use?



Key service and support issues

Highest score is 5.



Focus Data, Inc., an independent market research firm in Framingham, Mass., conducted the survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information on Focus Data services, call Mona Dabbon at (508) 626-2556.

GRAPHIC BY SUSAN SLATER

Continued from page 39

in this Buyer's Guide manage external encryption facilities. Encryption engines exist outside of the purview of network management products. As encryption facilities become more widely used, they must be brought into the picture to give users a complete view of their distributed environments.

PLUG-AND-PRAY INTEGRATION

Faced with the reality that no one vendor offers a management application or suite of applications that can do it all, users are left to deal with integrating different vendors' offerings to get the best of all worlds.

Users clearly want to integrate applications from different vendors to gain a complete picture of events in the network and to manage multiple network elements from a single point of control. Unfortunately, the industry has not yet given users applications that can be easily mixed and matched to create complete solutions. Users will have to plug and pray while vendors work to deliver plug-and-play applications.

In order to become integrated, applications must support three functions. First, different applications must be able to manipulate a single user interface employing a common model. Next, applications need to share common data. Finally, applications must be able to exchange common commands.

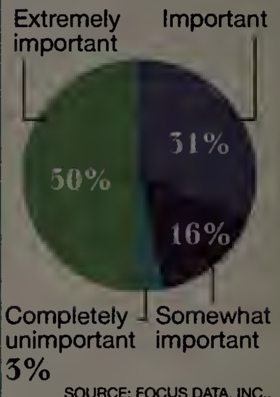
Most vendors are just now beginning to make their application data and commands accessible to each other using well-defined interfaces. Achieving the vision for the new generation of management applications depends on rapid progress toward standards to support further integration.

With data sharing, different applications could quickly find out when new devices are added to the network. For instance, if a file server is added to the network, the fault management application will usually find out about it first, typically through the use of an automatic discovery feature that can tell when new devices are hooked onto the network. However, the accounting management application wants to know about the presence of a new file server, as well. Thus, the fault manager will need to communicate with the accounting manager to maintain a consistent network information base.

This data sharing can take place using one of two methods. Applications can communicate by accessing common data stored in a SQL database or in ASCII files maintained by the management platform. These are reliable approaches, and users will fortunately find wide support for these methods. For example, Peregrine Systems, Inc.'s Peregrine Network Management System Client/Server supports both options.

Also, if two applications are running on top of the same operating system, one may be able to access information held by another through their common command line interface. A common command-line interface is the lowest common denominator between most management applications.

The importance of security management applications, according to a survey of *Network World* readers:



SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

Integration also means the ability for one application to call on another to perform a task. If a fault management application logs an SNMP trap indicating that a router is misperforming, it helps if the fault manager can immediately start the diagnostics application for that router. Moreover, a network operator saves time if the fault management application can pass the information it has about the nature and location of the problem to the diagnostics application.

Several vendors have built gateways that allow for such functional integration between applications. Gateways intercept a function call one application makes and translates that call to a format the other application understands. Also, application gateways can translate one application's internal data format and structure to a form that another application can use. Remedy has been particularly aggressive in building gateways between its Action Request System and other applications and management platforms.

Another approach to integration is to use application program interfaces (API) that allow one application to programmatically invoke a function in another application. Management application vendors are publishing API calls — typically accessible via C lan-

Continued on page 42

Empower your users

Given the right tools, end users can off-load many basic tasks from busy network managers and even obviate the need to run certain types of applications on network management platforms.

Shany, Inc. of Mountain View, Calif., is the first vendor to offer a product that empowers end users to solve their own problems without bugging operations staff.

Shany's AlertView is an application management package used to monitor and control word processing packages, databases or even custom applications running on end user workstations.

Essentially, AlertView intercepts the error messages that applications generate when they fail or experience problems. Left in their native state, these error messages are indecipherable to most end users. AlertView's role in life is to translate those error messages into a format that is clear enough for end users to take corrective actions.

AlertView uses the same manager-agent architecture as network management products. The AlertView Agent, running on the workstation, watches for application events. These events fall into six categories: DOS errors that include "Too Many Files Open" and "File Not Found;" file sharing violations; printer errors such as "Printer Out of Paper;" Novell, Inc. NetWare shell errors; Novell Btrieve errors; and Novell Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) errors.

The AlertView Agent generates alerts when it detects events. Alerts describe events and provide a context that details such data as the system being affected and when events occurred. The agent filters events using a variety of techniques before forwarding them to the AlertView Manager. AlertView filters using application names, frequency of events, repetition of the event and the name of it.

The AlertView Agent reports problems to the AlertView Management Console running on a separate workstation. The management console then provides facilities to automate responses to errors.

The AlertView Manager is an application that allows users to collect these events for analysis and action. The AlertView Manager can run any of 30 predefined remedial actions automatically when it receives an alert.

For example, in response to a "Too Many Files Open" event, AlertView Manager can open the end user's config.sys file and increase the number of files that that user can have open at any time. End users themselves can configure the program to set filter conditions and associate remedial actions with alerts.

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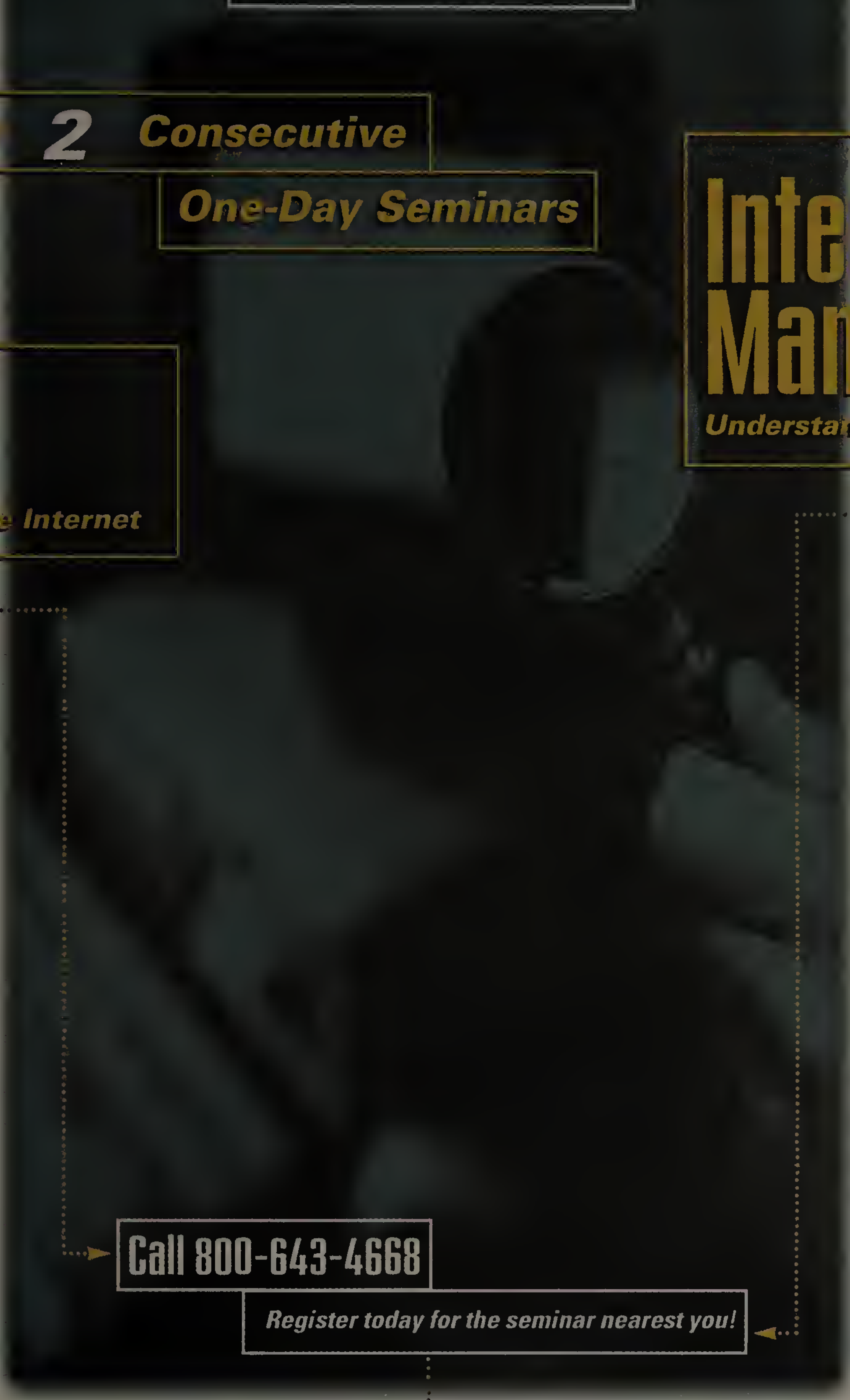

TCP/IP:

Analyzing the Protocols of the Internet

TCP/IP, originally designed for research and development communications, has rapidly evolved into the standard for multivendor internetworking and Internet connectivity in business environments. This uniform communications platform requires network professionals to possess an in-depth understanding of the TCP/IP protocols in order to optimize their organization's systems integration and network flexibility.

This one-day, information-packed seminar, taught by Mark A. Miller, will examine the Internet protocols (TCP and IP) and the related Network and Transport Layer protocols (UDP, ICMP, ARP and RARP). Included will be an analysis of the operation of the Application protocols (TELNET, FTP and SMTP), plus the standard for internetwork management, SNMP. You will also explore the integration of TCP/IP into LAN operating systems and the migration of TCP/IP to the OSI protocol suite.

Throughout the seminar, the analysis of these protocols will be illustrated using the Sniffer® protocol analyzer from Network General. This seminar will go beyond the theory of these protocols to show you how they operate and demonstrate troubleshooting techniques to solve typical problems.

Internetwork Management:

Understanding SNMP and SNMPv2

With the explosive growth of enterprise internetworks, the need for integrated network management systems to help simplify management operations has never been greater. Today's enterprise network management systems need to manage thousands of elements—from the hardware devices all the way to the applications and processes running on these networks.

SNMP (Simple Network Management Protocol) has become the de facto standard that holds the promise of enabling end-to-end enterprise network management. Implementing a network management system based on SNMP and SNMPv2 is a challenging task.

This one day, information-packed seminar, taught by Mark A. Miller, will help you understand the elements of an SNMP-based network management system, how to implement SNMP with your internetwork, plus the various enhancements such as the new message formats, improved error codes and security with SNMP version 2. In addition, you will learn how SNMP is being used to manage emerging broadband networks, including frame relay, SMDS and ATM.

Through the use of case studies, taken from live networks, and demonstrated with a Network General Sniffer® protocol analyzer, you will gain valuable insight broadband technologies such as frame relay, SMDS and ATM.

Call 800-643-4668

Register today for the seminar nearest you!

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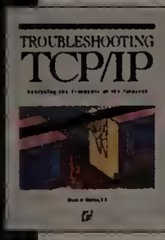
- *Two exclusive protocol reference guides: TCP/IP and Ethernet*
- *Valuable course diskette containing reference documentation and standards for TCP/IP and related technologies*
- *Luncheon and break refreshments*

Note: If you can't attend this seminar, a full attendee materials kit is available for just $99.95



Attending this seminar will help you . . .

- *Understand the formats of TCP, IP, UDP, ICMP and others.*
- *Study the functions of the supporting protocols, such as ARP, RARP, DNS, BOOTP, RIP, and OSPF.*
- *Learn how the application protocols, such as TFTP, FTP, TELNET and SMTP are integrated into a TCP/IP environment.*
- *Learn how to analyze typical TCP/IP internetworking situations, such as incompatible frame formats, duplicate IP addresses, and TCP flow and sequence control operation.*
- *Study the various TCP processes, including connection establishment, sequence control, flow control and connection termination.*
- *Learn how TCP/IP is supported in various host and LAN operating systems.*
- *Understand how IP-based routing works.*

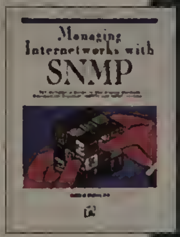
Location	TCP/IP	SNMP
Boston	Sept. 19	20
Denver	Sept. 22	23
Los Angeles	Sept. 27	28
Chicago	Oct. 4	5
Dallas	Oct. 6	7
Wash., D.C.	Oct. 17	18
New York	Oct. 19	20
Atlanta	Nov. 1	2
Minneapolis	Nov. 3	4
San Francisco	Nov. 9	10
Wash., D.C.	Nov. 29	30

Official Sponsor

SynOptics

Attending this seminar will help you . . .

- *Learn the details of the key elements of the Internet Network Management framework: the SMI, the MIB and the SNMP.*
- *Understand the Agent/Manager model of network management.*
- *Understand the enhancements found in SNMPv2, such as Manager-to-Manager communications, the GetBulk Protocol Data Unit and support for additional transport protocols including AppleTalk DDP, Novell IPX and ISO.*
- *Compare and contrast the ISO, IEEE, DMTF and Internet network management architectures.*
- *Study the security enhancements of SNMPv2 including authentication and encryption.*
- *Survey the key elements of Abstract Syntax Notation One (ASN.1), the language used to define SNMP message formats.*
- *Discover how SNMP can be implemented for WAN management, supporting broadband technologies such as frame relay, SMDS and ATM.*



$395.00 REGISTRATION FEE INCLUDES

- *Comprehensive seminar workbook*
- *Copy of* ***Managing Internetworks with SNMP*** *by Mark A. Miller*
- *Four exclusive protocol reference guides: SNMPv1, SNMPv2, RMON MIBs, Broadband MIBs*
- *Valuable course diskette containing reference documentation and standards for SNMP and related technologies*
- *Luncheon and break refreshments*

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Help desk

Continued from page 2

ing for WINport starts at $299 for a one-modem license.

For more information on the WINport products, call (800) 677-2727 or (416) 535-3555.

Along with WINport, you can use the following communications packages: Symantec Corp.'s pcAnywhere, Datastorm Technologies, Inc.'s Procomm Plus, Digital Communications Associates, Inc.'s (DCA) Crosstalk and Xerox Corp.'s Faxmaster.

For more information on these products, call Symantec at (800) 441-7234, Datastorm Technologies at (314) 443-3282, DCA at (800) 348-3221 and Xerox at (800) 275-9376.

I have an AST Research, Inc. 486/66 with OS/2 Version 2.1 and Novell's NetWare Requester for OS/2 Version 2.01 in a NetWare 3.11 network. I can log on via NetWare Tools to my preferred server and access that server's resources with no problem. But the requester always times out when I try to log on to other available servers on our network. Command-line utilities like MAP or LOGIN also fail when issued from an OS/2 full-screen session. When I boot DOS, I have no problems at all accessing available network resources from all servers. Do you know what might be the problem?

Debbie Wong, Rockville, Md.

Ron Nutter, a network systems engineer at IntraSource, Inc., a Novell Platinum authorized reseller and service center in Lexington, Ky., replies:

In April, Novell released Version 2.11 of the NetWare Requester, which addresses most of the problems reported with Version 2.01. You can download the latest version from the Novfiles area on CompuServe. In Novfiles, select the options "client" and then "OS/2" from the submenus.

You might also want to make sure your network interface card isn't set to Interrupt 2 or I/O range 2e0, as these are used internally by OS/2. Also, to get the latest OS/2 driver, contact the manufacturer of the network card you are using.

You should also use the following settings in net.cfg under the NetWare requester header: directory services off, large internet packet off and packet burst off. Be sure to keep each setting on a separate line and indented several spaces.

Letters

Continued from page 31

that even on local clients, OLE is a poor choice. When doing distributed or object-oriented applications, the primary question should be what happens when things go wrong. An article that fully answers this question would be very useful to myself and many others, I suspect.

Don Lanzinger
Engineering specialist
The Aerospace Corp.
El Segundo, Calif.

Just the fax

I recently read your article "Start-up to offer faxback service via 555 numbers" (July 4, page 22).

Could you tell me where I can get additional information about this service? Thank you.

Leighton Weston
DB2 systems programmer
New York Department of Information Technology and Telecommunications
New York

Editor's response: Contact Kelly Daniels, president of Telco Planning, Inc. in Portland, Ore., at (503) 224-1989. Daniels is a consultant for 555 FAX Information Telco, Inc., which is the company offering the service.

Buyer's Guide

Continued from page 40

guage — that other vendors may use to communicate and interact with their applications.

APIs open up applications for high performance use by other vendors. Yet the application vendor must support other companies that use its API with training and consulting services. Thus, the API approach is less common today.

However, some vendors, such as Auto-trol Technology, support the API approach.

MGMT. SUMMARY REPORT

Collectively, the new network management applications are an important step toward a unified management environment. These applications make network management much more open than it once was. The result is that the new applications can manage a greater range of devices today and will manage an even greater range in the future.

However, these are network management applications. Many of the problems users experience in using client/server environments are caused by failures in operating systems, in databases, mail routers, application servers and client applications themselves. Network management applications are often blind to these problems. What's needed is a combination of net and systems management.

Unified network and systems management will be a difficult technical feat to accomplish, however. The range of information sources and formats is large. SNMP alone will not get the job done.

This looming management information overload is the driving force behind new object-oriented management systems and applications. These systems represent all management information as a consistent set of objects, mapping information from multiple protocols into these objects.

Application vendors will be able to write to these object definitions, rather than having to support multiple management protocols. The result should be applications that are simpler to develop, maintain and integrate than they are today.

Several vendors — including Auto-trol Technology, HP, NetLabs and Tivoli Systems, Inc. — are taking the lead in bringing the object approach to market. Their investments should bring users closer to the dream of a unified, consistent management environment that makes the client/server world totally reliable.

➡ Rymer is editor in chief of "Distributed Computing Monitor," a monthly report by Patricia Seybold Group, Inc. of Boston. He can be reached at (617) 742-5200 or via the Internet at 467-1743@mcimail.com.

CORRECTION

In his "Security Perspectives" column that ran July 18 (page 31), Michel Kabay's name was inadvertently misspelled. *NW* regrets the error.

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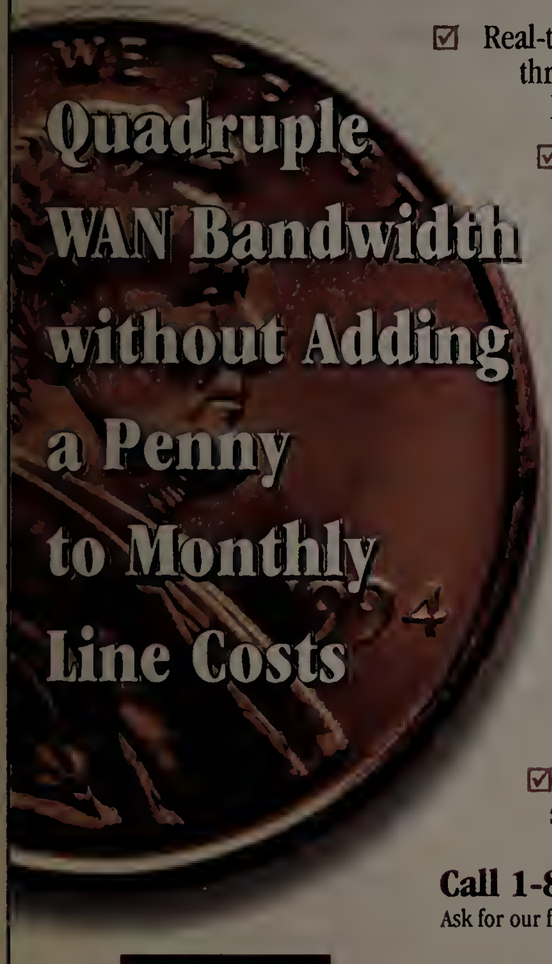

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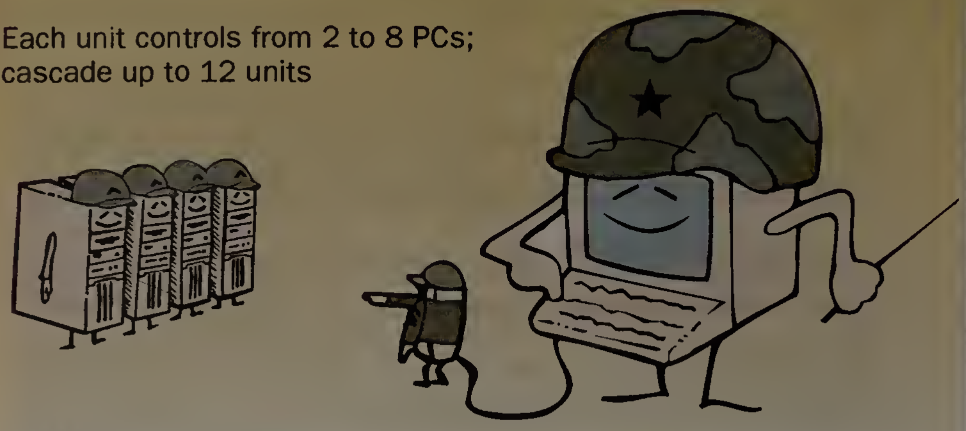

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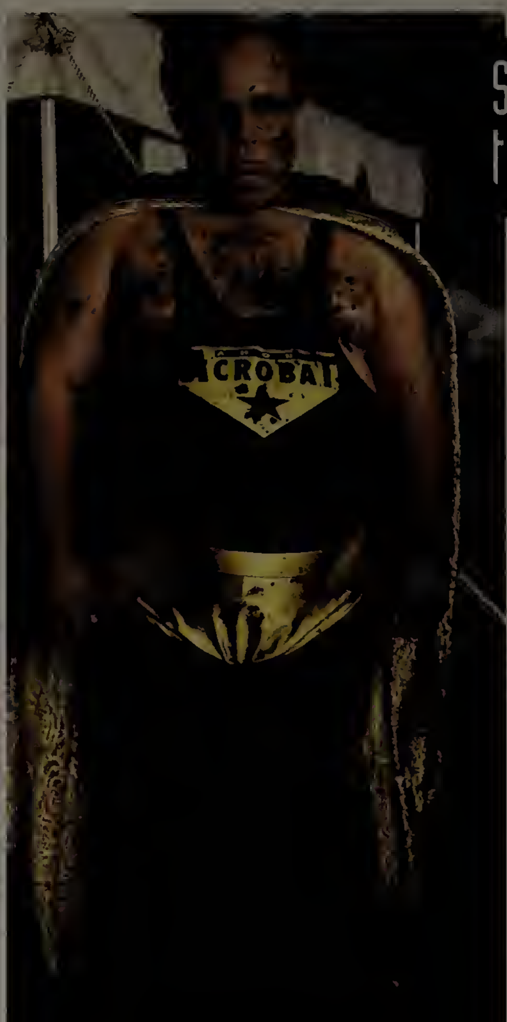

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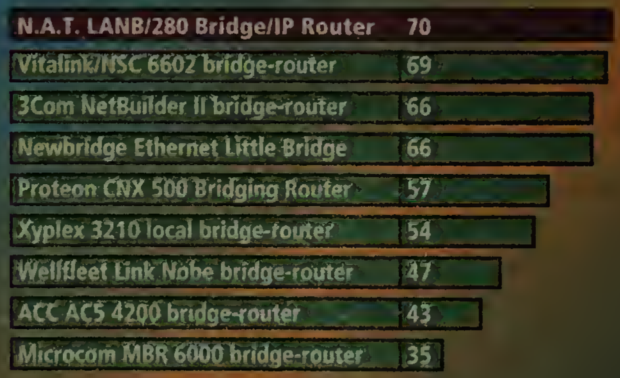

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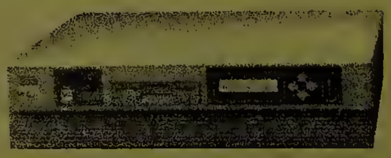

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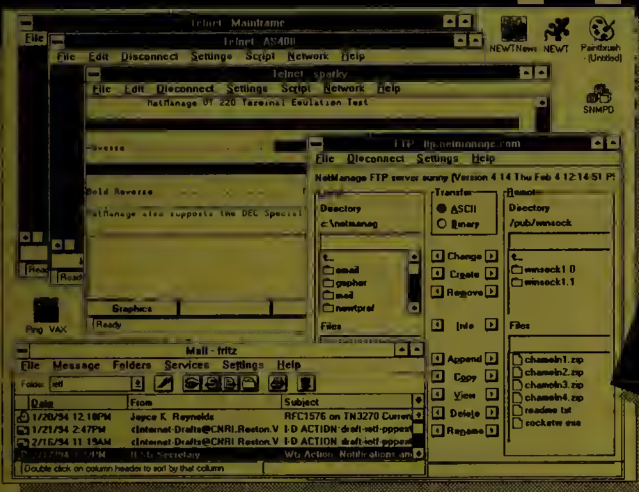

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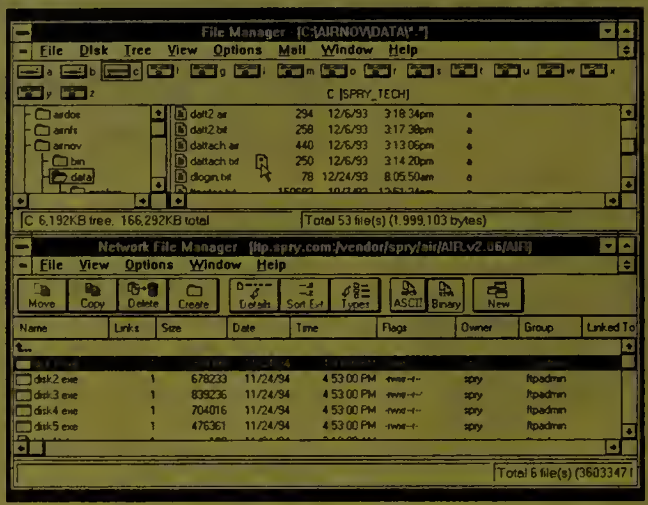

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airnov     dattach.air   440  12/6/93   3:13:06pm
  bin      dattach.txt   250  12/6/93   3:14:20pm
  data     dlogin.txt     78  12/24/93  8:05:50am
C: 6,192KB free, 166,292KB total    Total 53 file(s) (1,999,103 bytes)

Network File Manager - [ftp.spry.com:/vendor/spry/air/AIR.v2.06/AIR]
File  View  Options  Window  Help
Move  Copy  Delete  Create  Details  Sort Ext  Types  ASCII  Binary  New
Name       Links  Size    Date      Time        Flags     Owner  Group    Linked To
disk2.exe  1      678233  11/24/94  4:53:00 PM  -rwxr--r--  spry  ftpadmin
disk3.exe  1      839236  11/24/94  4:53:00 PM  -rwxr--r--  spry  ftpadmin
disk4.exe  1      704016  11/24/94  4:53:00 PM  -rwxr--r--  spry  ftpadmin
disk5.exe  1      476361  11/24/94  4:53:00 PM  -rwxr--r--  spry  ftpadmin
                                         Total 6 file(s) (3603347
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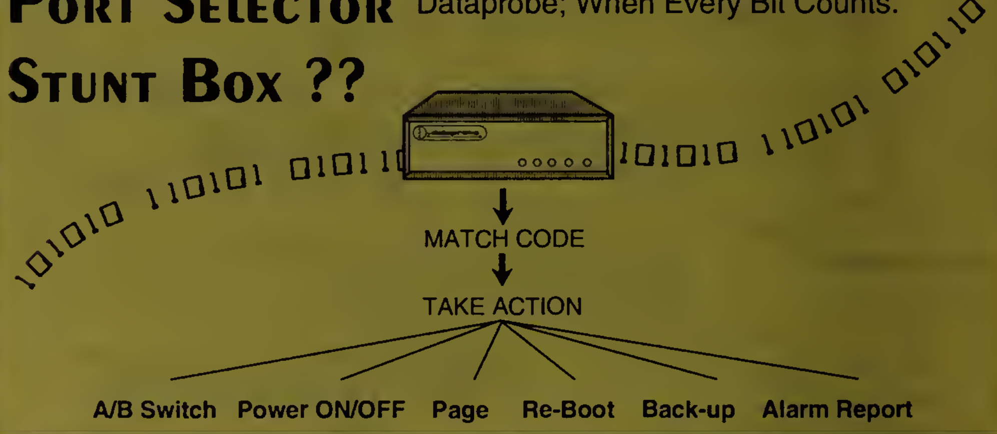

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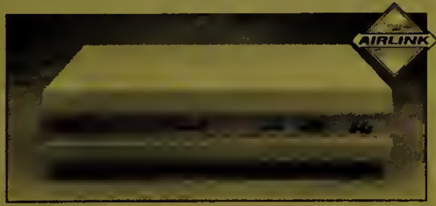

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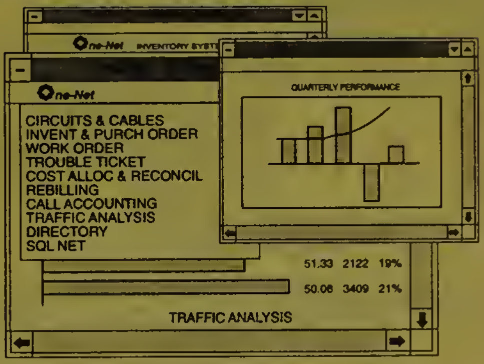

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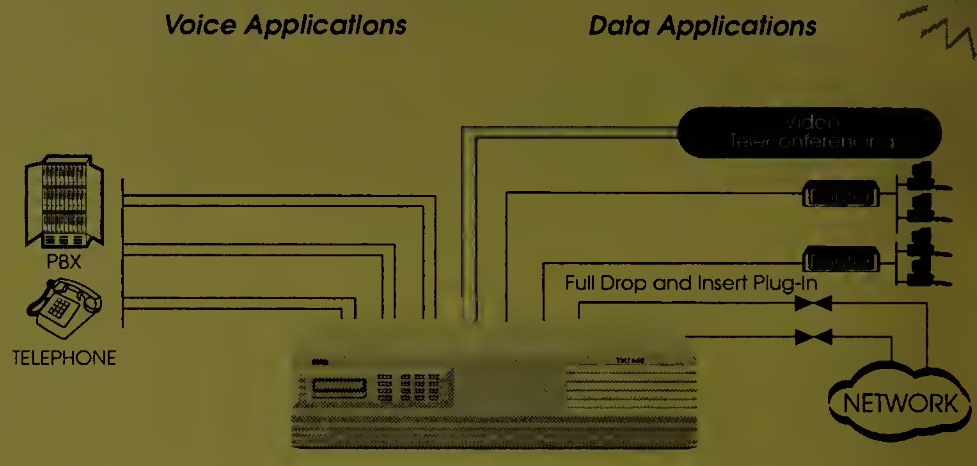

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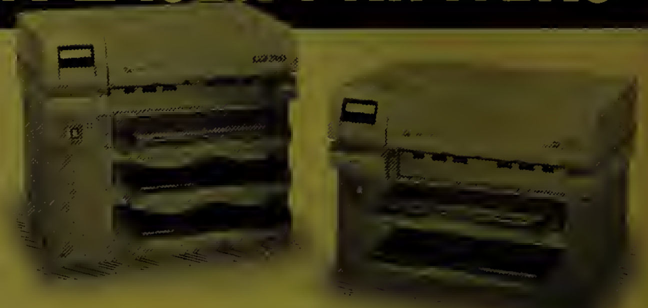

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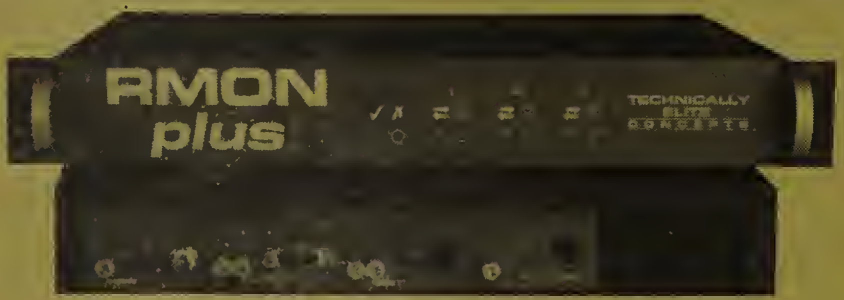

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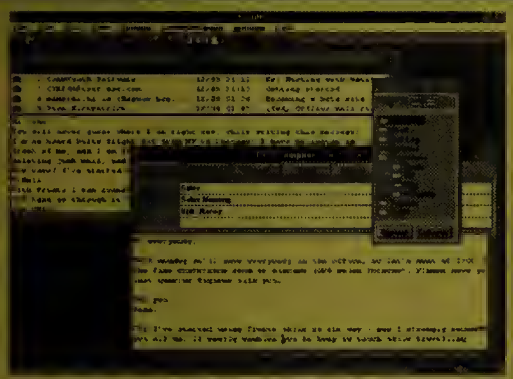

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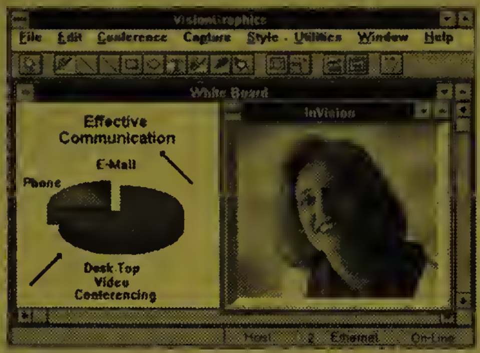
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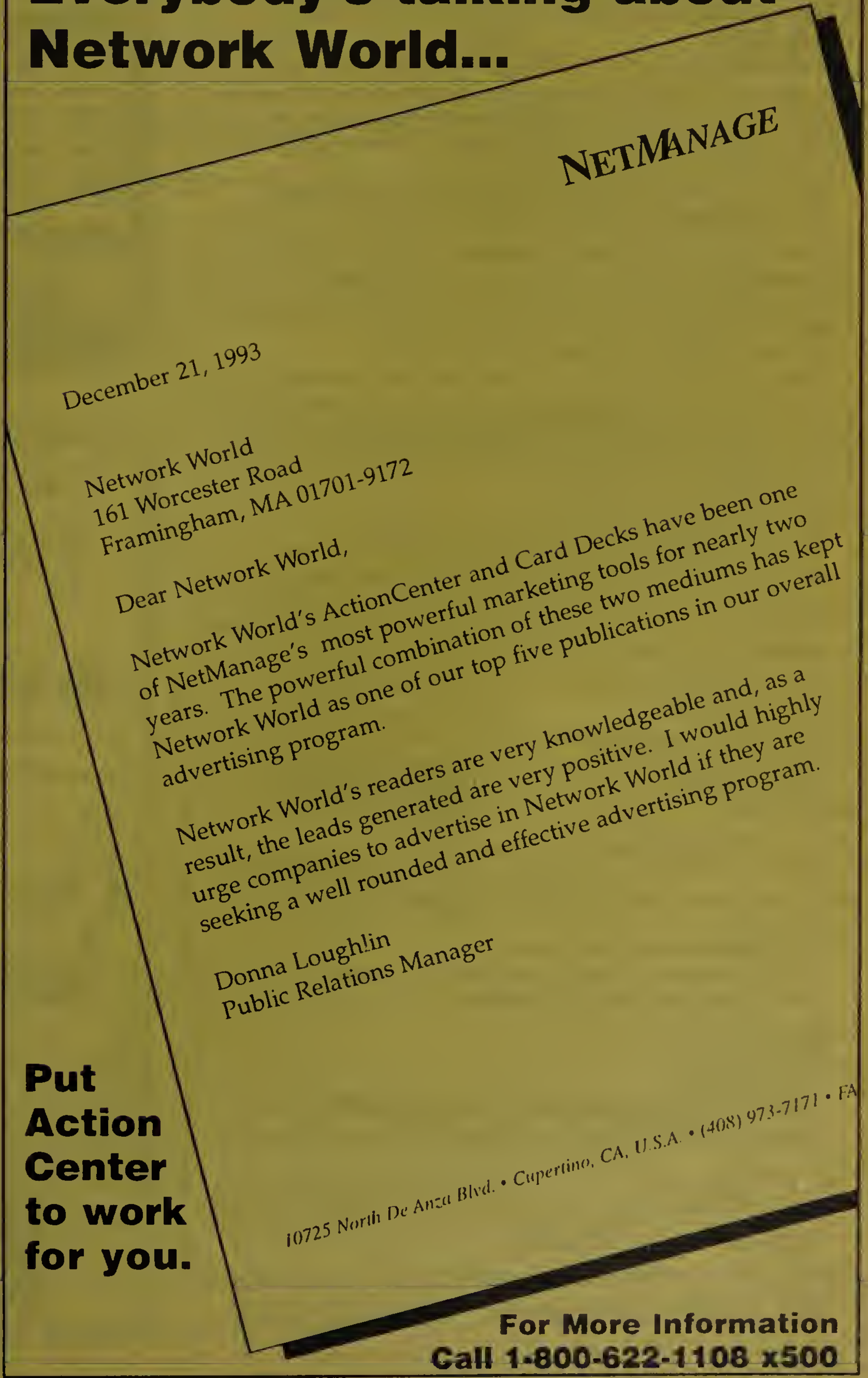

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Video Dial Tone Service is planned for initial availability in the following metropolitan areas within the Bell Atlantic territory:

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Initial Market Deployment is planned to begin in the first half of 1995, with product terms and pricing subject to Federal Communications Commission tariff approval. The Network Interface Specifications are identified as follows and defined in the referenced documents:

Interface No. 1: Broadcast Analog Video & Bonus Channels. Baseband Analog signals must interface the network from video providers using interface 2TV6-2 as defined in section 4.2 of: Bellcore TR-NPL-000338, "Television, Special Access and Local Channel Services", Issue 1, December 1986.

Bell Atlantic Contact: Mr. D. Little (301) 236-3258
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Interface No. 2A: The Analog Interface to the Customer is defined by Cable Television Technical and Operational Requirements, 57 FR 11000 (April 1992) (Codified AT 47 C.F.R. Part 76) and can be obtain from the FCC.

Bell Atlantic Contact: Mr. D. Little (301) 236-3258

Interface No. 2B: Network Interface Module (NIM) to the HFC coaxial Media Interface is defined in the Bell Atlantic Full Service Network, Network Interface Module to Hybrid Fiber Coax, Coaxial Media Interface, 309-204-120, Issue 1, August 1994 from AT&T.

Bell Atlantic Contact: Mr. Kamran Sistanizadeh (703) 974-3269
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Interface No. 3: Digital Broadcast Interface: Unidirectional 44.736 Mb/s/ATM/MPEG-2 is defined by Bell Atlantic Full Services Network, Unidirectional 44.736 Mb/s Digital Broadcast Interface, 309-204-121, Issue 1, August 1994 available from AT&T. The OC3 interface will be defined later.

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Interface No. 4: The Signalling Interface Specification between a) the Video Dial Tone (VDT) Network and the Video Information Provider, and b) the VDT Network and the Video Information User is defined by the Signalling Interface Specification for Video Dial Tone, TR-72540, Issue 2, Release 1, August 1994.

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- Understanding of network-based security techniques (e.g., firewalls, TCP Wrapper, smart cards)
- Understanding and involvement with IETF working groups process a plus
- Previous experience associated with NREN, HPCC, Gigabit testbeds a plus

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HUGHES

HUGHES APPLIED INFORMATION SYSTEMS

Shell

Continued from page 1

But Hans Wolf, senior systems analyst at Shell, based in Houston, said at the Object World show here last week that it is far more difficult than that. "Just because these are objects doesn't mean they're reusable," he said.

Five years after the company began developing a library of reusable objects to support networked applications, such as one to access and manipulate seismic data across a net, Shell has yet to see any reduction in the time it takes to get new applications to users.

But Wolf expects that to change in about a year as developers reach the top of their learning curve.

And while Shell now seems to be saving by reusing objects, getting to this point has meant overcoming a significant number of technical, political and training issues.

Shell began looking at object reuse in the mid-1980s as its scientists and engineers saw their ranks reduced through staff reductions. The search for oil was traditionally handled in several discrete stages — the engineers who processed seismic readings simply handed off their work to the engineers who actually analyzed that data — but the reductions were forcing these teams to work more closely together.

The problem was that over the years, these teams had developed separate and largely incompatible systems for delivering back-end data to the Unix workstations used by the engineers, Wolf said.

In 1989, Wolf and two senior developers began looking at how to develop a library of reusable objects that could be quickly dropped into new applications.

Wolf and his team quickly ran into a series of problems.

KEYS to the MOVE

- Develop a consistent architecture for applications so they can use and share existing objects.
- Form an object library development team.
- Assign a reuse developer for each application project to ensure that new objects can be stored in the library for reuse.

The first was figuring out how to take objects developed for a particular application and redesign them so they were generic enough for reuse in another application.

Application developers were too busy writing programs to worry about modifications that would let their code be reused.

However, developers were also leery of using code written by other applications teams — and their managers worried about the loss of control that might come by using recycled code.

Because the company had no rules for such tasks as calling up graphics and painting an interface on a screen, each development team did things differently, reducing the chances that their code would fit into others' applications.

One answer was to assign a reuse engineer to each development project. This sometimes meant three to four major revisions in specific objects before they were ready for use under the new system.

However, Wolf added that it also meant applications were coming out with features that previously had lagged behind initial delivery, such as documentation and printer support.

Wolf's team, which now comprises 14 engineers, also developed guidelines for building specific program functions.

POLITICAL BATTLES

Wolf said he continues to fight political battles.

Developers have no real incentives to reuse objects, except to learn a new technology in case they are laid off.

And "we still have a significant amount of organizational infighting that occurs between myself and other project leaders," he said.

What has helped, he noted, has been support from top management as well as the quality of the objects in the library.

Today, Shell has a library of about 600 reusable objects, with another 500 to 600 still to go. Some applications now consist of 90% recycled objects, he added. ◘

Comments?

See "Contacts" box on page 2.

ATM

Continued from page 1

however, he said there are a number of holes to fill. They include standard application program interfaces (API) for new applications that directly access ATM services, switched virtual circuits (SVC), adequate diagnostic procedures and a voice signaling standard.

BEERING

Amoco kicked off a 16-vendor ATM trial in January to see if and how the technology would impact its business (*NW*, Jan. 17, page 1).

The firm recently completed building the five-node, wide-area ATM infrastructure for the project, dubbed ATM Research & Industrial Enterprise Study (ARIES), for which Beering is co-project leader.

The ARIES net includes wide-area permanent virtual circuit (PVC) ATM services from Ameritech, Sprint Corp. and WilTel, along with local-area network equipment and software from Cabletron Systems, Inc., Fore Systems, Inc., SynOptics Communications, Inc. and others.

So far, it has demonstrated that "ATM holds great promise in the geophysical part of the Amoco business," Beering said.

Seismological modeling applications that generate gigabits of data are a big driver for ATM at oil companies in general.

"We have applications that ruin FDDI, they are so data intensive," Beering said.

ATM has boosted performance while containing costs for those applications, he added.

For example, at Amoco, ATM is enabling applications that rely on clusters of computers to work collaboratively; today, the company might limit the communications among the computers because the FDDI and switched Ethernet links between them run out of gas.

Amoco's WAN ATM test, which connects two Chicago-area sites with Tulsa, Okla., Houston and Minneapolis at 45M bit/sec speeds (see graphic, page 1), has shown "that we can connect flexibly and scalably to new business partners. It's all done in software. That's what ATM gives me that I can't do today," according to Beering.

Amoco has kept one dedicated DS3 link in the network between Chicago and Houston for comparing performance and capabilities with ATM.

The ATM net, which uses DS3 access links and up-to-20M bit/sec. PVCs, have shown an improvement over the 45M bit/sec private line, Beering said, though he would not site specifics.

NOT THERE YET

But there are not yet good mechanisms and procedures to debug ATM, Beering said. "Part of it is an experience issue," he said. "We don't know yet how to fix something when it breaks."

Likewise, new applications that grab the ATM services, such as desktop videoconferencing, do not yet exist. Video running on ATM — in other words, in noncircuit-emulation mode — must move through the network at higher priority than data because of its delay-sensitive nature.

"ATM has all the building blocks for that, and certain vendors, such as Fore Systems, have developed their own APIs," said Ron Jeffries, president of Jeffries Research, a consultancy in Santa Maria, Calif. But there are as yet no standards.

This means that users can employ ATM prioritization services — such as specifying minimum required bandwidth or maximum delays and cell loss tolerated — only in a proprietary way.

To that end, the Service Aspects and Applications group of the ATM Forum hopes to have primitive rules hammered out by the fourth quarter to give programmers and operating systems access to ATM services, according to an ATM Forum spokeswoman.

In addition, the industry must nail down voice signaling standards for ATM and implement SVCs.

The voice signaling specifications have not been built because "it simply hasn't been a priority; most people are running out of room on their data nets now," according to Beering.

Most carriers with ATM offerings have said they will support SVCs next year, which would preclude users from having to specify PVCs between every device on the net.

Products that support the ATM User-to-Network Interface 3.1, which supports SVCs, are expected to ship within the next several weeks from switch and adapter card vendors.

In the meantime, though, "we are building complex capabilities in a matter of days" and leveraging the virtual mesh PVC architecture for redundancy, Beering said. "We are encouraged." ◘

Synergy

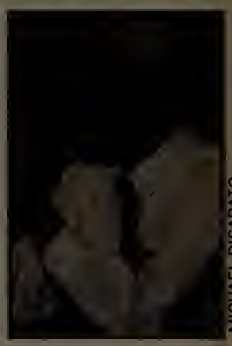
Continued from page 1

application — such as asset management — to address related events in another network.

Today, OpenView only provides common management services for Internet Protocol networks.

"Our SNMP platform today provides an access product for discovery, monitoring, data collection, [Management Information Base] handling and so forth that are all specific to IP," Robinson explained.

"We can see the same kind of an access product perhaps for [Common Management Information Protocol devices], for NetWare, for [Common Object Request Broker Architecture]-based plumbing and so forth. That way, we can make the platform very modular" and tailor it to meet customers' needs, he added.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STURM

HP competitors IBM and SunSoft, Inc. are believed to be developing similar capabilities for their respective NetView/6000 and Project Encompass management platforms, observers said. But they will differ in their methods for discovering and mapping nodes, monitoring events, and collecting, storing and accessing management data.

COMMON PLATFORM BENEFITS

OpenView users said they could benefit from Common Platform services.

"Those capabilities would be very attractive and helpful in our environment," said Rick Sturm, a member of the technical staff at US WEST Advanced Technologies in Boulder, Colo. "We have a large and diverse environment, and we're seeking to manage it on an integrated basis."

Others said Common Platform has been long-awaited.

"It's something that's long overdue," said Frank Belland, senior communications consultant at Martin Marietta Corp. here. "The current design of OpenView only allows 3,500 events. It's not flexible enough to handle the multiple protocols."

Belland said HP provided users and developers with insight into the Common Platform last year. At that time, HP said Common Platform will present on the OpenView screen a separate event window, based on the network protocol, that will allow users to drill down to specific events in specific network environments, Belland said.

WALTER CALAHAN

McCONNELL

"It would be interesting to see how that interplays with the NetLabs [Inc.'s] inference engine," Belland said. HP and NetLabs recently announced a technology licensing agreement that will add NetLabs' NerveCenter event correlation technology to OpenView (*NW*, June 20, page 1).

Analysts said Common Platform could make other network-specific applications more generic.

"Generally, applications have to be written to each kind of [network] architecture to handle events" in them, said John McConnell, president of McConnell Consulting, Inc. in Boulder. "[Common Platform] would be a common event and data handler. So I could have a more generic application, like an asset and inventory manager, that wouldn't have to depend on a particular source of events or information. It could work across all of those."

Common Platform could also apply to system performance profiling and baselining applications, as well as software distributors, McConnell said. ◘

AT&T

Continued from page 1

charges to connect to PDS, plus a premium for Notes.

AT&T Network Notes users will pay the same connect charges as other users accessing AT&T's PDS value-added net: between $4 and $8 per hour for dial-up access or $500 to $5,000 per month for dedicated access. They will also pay a yet-to-be-determined amount for every byte of data they process through Notes.

The price structure is designed to encourage users to log on to the network, download data to their desktops and work locally, said Bob Longueira, AT&T's marketing director for PDS.

Observers warned that dial-up access charges and per-byte charges could mount at those companies where Notes catches on; dedicated access will be used mainly by large companies with heavy transaction-based processing needs.

Heavy demand

AT&T said it has received 180 applications from customers wanting to enter a beta-test program for AT&T Network Notes in September. About 12 will be chosen.

"It wouldn't be bad for occasional use," said Heidi Dix, an analyst at Forrester Research, Inc. in Cambridge, Mass. "But for those people who live and breathe in Notes," connect charges would add up, she said.

Nic Di Iorio, vice president of networking and telecommunications at advertisement agency Young & Rubicam, Inc. in New York, said the price is "a little bit steep" compared to the cost of maintaining a Notes network in-house.

When AT&T Network Notes is actually delivered, Young & Rubicam will consider using it for remote offices, where it is not cost-effective to install a Notes server, but will not consider heavy use of the service.

Young & Rubicam has 40 Notes servers and will eventually spend less than $40 a month per user to maintain its worldwide Notes network. It currently spends about $100 a month per user for 700 Notes users on a network that can handle 3,000 users without adding any hardware or software, Di Iorio said. Within 12 months, the company will have at least 1,200 Notes users on the network, drastically cutting the per-user cost, he added.

AT&T's estimate of Network Notes charges ranges between $42 and $83 per user per month. The bottom of that range is reasonable, but the upper range "is just too much," said Di Iorio, who noted that he would like to see estimates closer to $25 per month.

Bill Wilson, senior vice president for MIS at New York-based insurance broker Johnson & Higgins, said he thinks the connect charge is reasonable because it is competitive with charges for other value-added networks such as CompuServe and America Online. But the total service still seems too expensive, he added.

Network Notes really offers a benefit to users that want around-the-clock network access for their employees who are traveling or work in remote offices but who cannot afford to build and maintain a wide-area network 24 hours a day, seven days a week, said Tom Nolle, president of CIMI Corp. in Voorhees, N.J.

"There are a number of small and midsize companies that have a lot of sales and marketing people out on the road that would not care that it costs them $1,000 per year per employee if it saves them the hassle of having to administer the network themselves," Nolle said.

AT&T is not pricing or marketing the service as an adjunct to existing Notes networks, Longueira, said. The company wants to provide Notes networks to users who do not have them by pricing its Network Notes service so that it is comparable to building and maintaining a Notes network in-house, he said. ⧉

IP

Continued from page 1

The new protocol, expected to be finalized in September, will not require any immediate changes to users' existing IP enterprise internets. However, users will need to upgrade their routers and eventually change applications if they want to take advantage of advanced features in IPng software when it rolls out next year.

New features will include flow control, autoconfiguration and encryption-based security. These are certain to please the business community, which often does not regard the public Internet as a commercial-grade service.

The new protocol will also support dial-up and wireless communications.

"We have to change the way we do IP routing" to meet evolving user needs, said Scott Bradner, cochairman, along with Allison Mankin of the IETF's IPng area group, which was set up to review the competing proposals for IPng and reach a decision.

Presenting the IPng recommendation at last week's IETF meeting, Bradner and Mankin highlighted the protocol's Flow I.D. feature, which will permit users to designate class of service for packet delivery and encourage innovative Internet services.

Vinton Cerf, founding father of the Internet and now president of the Internet Society and vice president for data communications at MCI Communications Corp., hailed the IPng decision as "an effective step in solving a critical problem."

SIPP, CATNIP OR TUBA?

Last week's announcement, while not clearing up all the technical issues bearing on IPng, appeared to knock some competing proposals out of the running.

The three IPng candidates under review had been the Simple Internet Protocol Plus (SIPP), the Common Architecture for Next-Generation Internet Protocol (CATNIP) and a third, TCP/UDP over CLNP-Based Networks (TUBA).

Mankin said a 15-member panel consisting of The Boeing Co., a large network user, as well as vendors such as AT&T, Microsoft Corp. and Wellfleet Communications, Inc., determined that not one of the three proposals by itself was ideal.

All the proposals could have worked, but each lacked in some respect, she added. IPng is based primarily on SIPP and TUBA.

IPng profile

- 16-byte fixed-length address space
- Autoconfiguration
- Encryption-based security
- Service classes through Flow I.D. feature
- Wireless network support

But the SIPP specification, based on a fixed-length address space, clearly triumphed over TUBA, a 20-byte variable-length address space based on the Open Systems Interconnection standard's Connectionless Layer Network Protocol (CLNP). IPng will be based on SIPP's fixed-length address format but will be longer, doubling from 8 to 16 bytes.

The IETF last week set up new technical working groups on IPng autoconfiguration, transition and testing. The IETF will also examine how IPng could affect Transmission Control Protocol/IP applications, such as File Transfer Protocol and Simple Network Management Protocol.

The group's goal is to finalize the IPng spec in September so it can be voted on at the December meeting. Working IPng code should be available within a few months.

One user, Robert Moskowitz, technical support specialist of management information systems at Chrysler Corp., gave a vote of confidence to the IETF's decision on a fixed-length IPng address. Variable-length address schemes create a hierarchical structure requiring more management for the user, he added.

A user at a large company with an 80,000-node TCP/IP network who requested anonymity expressed an initial favorable reaction to IPng. But the birth of IPng does not mean his company would go through the time and expense of migrating to IPng immediately even if Internet providers do.

The IETF's IPng decision evoked criticism from several quarters, as well.

Peter Ford, a member of the technical staff at Los Alamos National Laboratory and a developer of the TUBA proposal, said the CLNP variable-length architecture is preferrable to the fixed-length SIPP because it is flexible and extensible.

Bill Simpson, head of Ann Arbor, Mich.-based consultancy Computer Systems Consulting Services, Inc., said the 16-byte fixed-length address scheme would make response times on mobile links much worse than they are now. Paul Mockpatris, IETF chairman, said techniques such as header compression could help that. ⧉

WilTel

Continued from page 4

of customers and revenue.

The deal is not a certainty, however. The Williams Companies, Inc., WilTel's corporate parent, turned down a $2 billion offer from LDDS in May.

Spokespeople for WilTel and LDDS declined to comment on the latest bid, which was reported in *The Wall Street Journal* last week but has not yet been publicly announced. A source within WilTel confirmed the bid was on the table.

The decision to accept the offer hinges on whether The Williams Companies will consider it fair based on current cash flows or hold out for more because of the value of its network infrastructure, according to Joe Beatty, an analyst with Duff & Phelps in Chicago.

"Why do you want to sell now when the telecom industry is on such a high note?" Heckart asked.

LDDS paid around seven times annual revenues in 1992 when it acquired Advanced Telecommunications Corp., a regional long-distance carrier, Beatty said. Based on those calculations, the current bid of $2.5 billion for WilTel sounds about right and should be accepted, he said.

LDDS has made a habit of growing through acquisitions, picking up Metromedia Communciations Corp. and Resurgens Communications Group, Inc. in 1993. This latest deal would make sense for LDDS by allowing it to cut transport costs. Currently, the carrier buys capacity on other carriers' networks; purchasing WilTel and its national fiber network would cut back on transport expenses.

While it is understandable why LDDS would want to buy WilTel, it is less clear why The Williams Companies would want to sell, said Christine Heckart, an analyst with consultancy TeleChoice, Inc. in Verona, N.J. Williams has spent the past decade building up WilTel and is finally beginning to see that investment pay off, according to Heckart.

"They have invested a ton of money and energy into the company," Heckart said. "Why do you want to sell now when the telecommunications industry is on such a high note?"

WilTel's national fiber network is an asset that will not soon be duplicated, Heckart said. WilTel should hold on to its prize asset, especially since the wealthy regional Bell holding companies may soon by entering the general long-haul market, she said. ⧉

NETWORK WORLD

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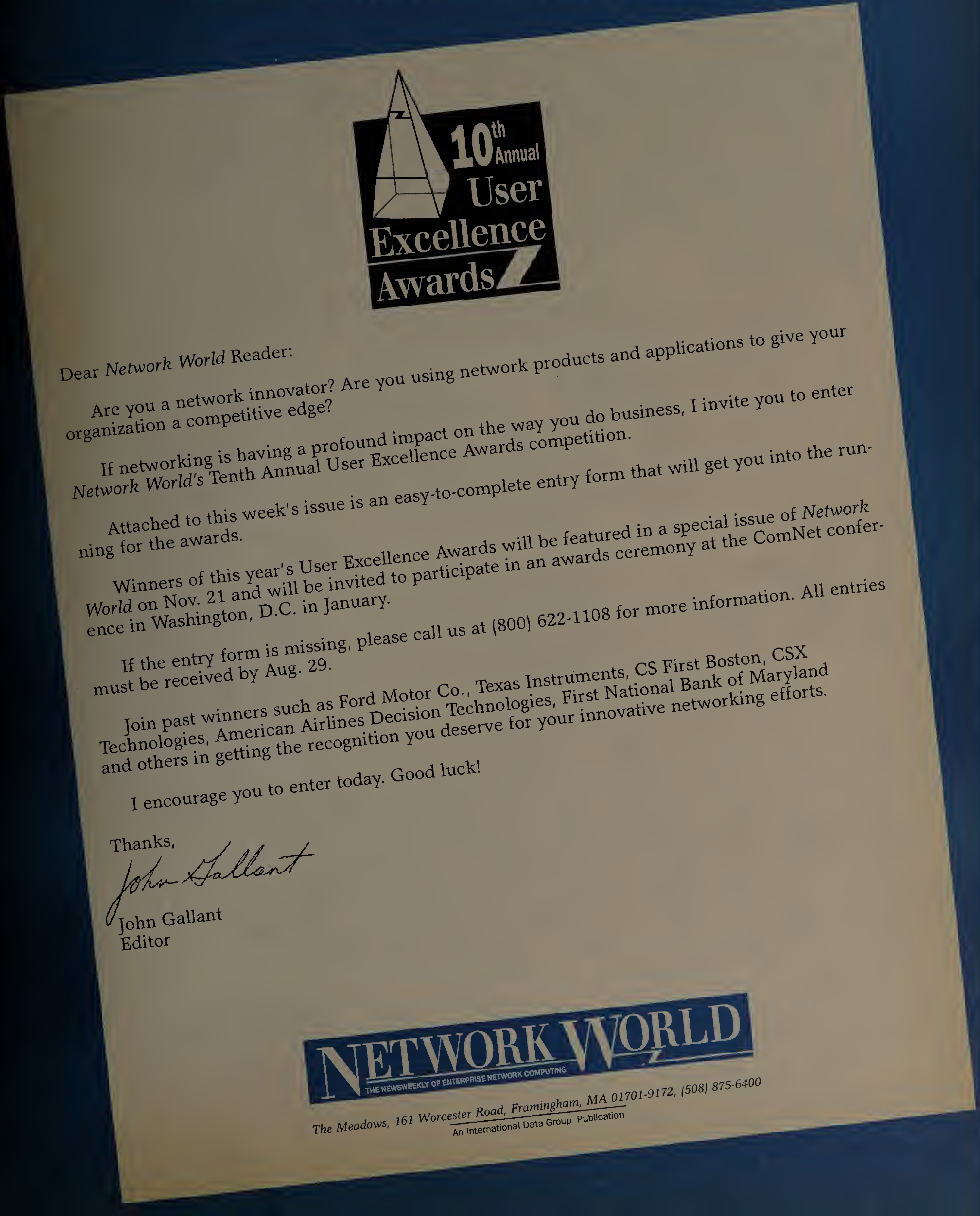
Enter today for our User Excellence Awards!



10th Annual User Excellence Awards

Dear *Network World* Reader:

Are you a network innovator? Are you using network products and applications to give your organization a competitive edge?

If networking is having a profound impact on the way you do business, I invite you to enter *Network World's* Tenth Annual User Excellence Awards competition.

Attached to this week's issue is an easy-to-complete entry form that will get you into the running for the awards.

Winners of this year's User Excellence Awards will be featured in a special issue of *Network World* on Nov. 21 and will be invited to participate in an awards ceremony at the ComNet conference in Washington, D.C. in January.

If the entry form is missing, please call us at (800) 622-1108 for more information. All entries must be received by Aug. 29.

Join past winners such as Ford Motor Co., Texas Instruments, CS First Boston, CSX Technologies, American Airlines Decision Technologies, First National Bank of Maryland and others in getting the recognition you deserve for your innovative networking efforts.

I encourage you to enter today. Good luck!

Thanks,

John Gallant

John Gallant
Editor

NETWORK WORLD
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

The Meadows, 161 Worcester Road, Framingham, MA 01701-9172, (508) 875-6400
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Support. That's what we're talking about here. The cabling support you need to handle all the applications you're moving onto your network today, as well as all the data traffic you know you'll be adding as you grow. Understanding why you need to upgrade your cabling system isn't hard. And now it's just as easy to find someone you can trust to put it all together.

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Anixter. *Nobody knows networking like we do. Especially from the ground up. No other supplier can offer you more choices of structured cabling systems. Along with the design and post-installation expertise and support to help you manage your network. When it comes to structured cabling systems, there's really only one place to land:*

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Call for Entries

Network World believes networking can change the way organizations do business, helping them become more competitive, more productive and more responsive to opportunities and changing market forces. Each year, through our User Excellence Awards, we honor users that have applied network technology to gain a competitive edge.

Here's your chance to spotlight your innovative networking efforts and get into the running for the Tenth Annual User Excellence Awards. Winners of this year's User Excellence Awards will be featured in the November 21 issue of *NW*. The awards will be presented before the keynote address at the ComNet conference in Washington, D.C. in January.

Please submit a 250- to 500-word abstract explaining how networking has helped your organization achieve its strategic goals. How has networking helped you differentiate your products and services from competitors or launch new offerings? How has it enabled you to bring new products and services to market more quickly? How has it helped you reduce your operating costs? How have technologies such as electronic data interchange helped you build closer working relationships with customers, suppliers and other business partners?

10th Annual
User
Excellence
Awards

The size of your network isn't important; what matters is how networking has helped your company achieve its objectives. Only entries submitted by users will be considered. No vendor-supplied customer nominations please.

Please print your abstract on a separate sheet and return it with an entry form via MCI Mail (390-4868), via the Internet (network@world.std.com), by facsimile at (508) 820-1103 or by mailing your entry to: User Excellence Committee, *Network World*, 161 Worcester Road, Framingham, Mass. 01701.

Please be sure to include your name, title, address and phone number.
All entries must be received by Aug. 29.

Get the recognition you deserve for your innovative networking efforts by entering *Network World's* Tenth Annual User Excellence Awards today!

Good Luck!

ENTRY FORM

To enter *Network World's* Tenth Annual User Excellence Awards, please submit a 250- to 500-word abstract outlining how networking has helped your organization achieve its strategic goals. You may send us your entry via MCI Mail (390-4868), via the Internet (network@world.std.com), by fax to (508) 820-1103 or by mail to:

User Excellence Committee, *Network World*
161 Worcester Road
Framingham, Mass. 01701

All entries must be received by Aug. 29.

Name: ______________________________

Title: ______________________________

Company name: ______________________________

Address: ______________________________

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Phone number: ______________________________

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Join the elite corps of network innovators

Enter *Network World's* User Excellence Awards

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Past User Excellence Award winners

1993	*1992*	*1991*	*1990*	*1989*	*1988*
Connecticut Mutual Life Insurance Co.	Ford Motor Co.	Columbia Gas Transmission Corp.	American Airlines Decision Technologies, Inc.	CSX Technology, Inc.	American Expres Travel Related Services Co.
CS First Boston	Medical Center of Delaware	Texas Instruments, Inc.	First National Bank of Maryland	Sears Technology Services, Inc.	Bechtel Group, Inc.